Neutrinos at the Main Injector (NuMI) Project
Project No. 98-G-304
Progress Report No. 52
March 1-31, 2003
(G. Bock, A.L. Read - Editors)
(NuMI-915)

I. PROJECT DESCRIPTION

The NuMI Project provides for the construction of an intense, variable energy, beam of neutrinos using the Fermilab Main Injector, as well as large underground neutrino detectors located at Fermilab and Soudan, Minnesota. The purpose of the project is to enable a new generation of long baseline neutrino experiments that can decisively detect and accurately measure neutrino oscillations. Detection of such oscillations would firmly establish a non-zero value of neutrino mass. The neutrino beam will be of sufficient energy that experiments capable of identifying muon neutrino to tau neutrino oscillations are feasible. The scope of the NuMI Project includes the excavation of large underground laboratories to house the neutrino beam system and the MINOS detectors.

II. OVERVIEW OF PROJECT STATUS – G. Bock

This month concludes the first half of FY03 with the NuMI Project continuing to make very good progress. Overall the project is now 82% complete -- 76% complete on the TEC and 92% complete on the OPC. The project remains on the budget and ahead of the schedule proposed nearly two years ago and approved in December of 2001.

During the first half of FY03 over $16M of earned value was accumulated. Our contingency use during this time was minimal -- $250K net on the TPC and consistent with our projections for this period.

A total of six DOE Milestones are due in FY03—three Level 2, and three Level 1. After the first half of FY03, five are complete. All were completed well ahead of their due dates. Our current projection for the last milestone (Level 2) for FY03 shows completion 85 days ahead of the due date.

Work on the Service Buildings and Outfitting contract has started well. We have had no injuries to date on this, the project's last large conventional construction contract. Corrective actions have been taken by Fermilab and the contractor on occasions where safety rules have not been followed. A schedule variance first reported in February continues to be monitored closely. This month the contractor has submitted a revised work plan to complete the project on schedule, and it is currently under our review. There has been modest contingency use to date, and future anticipated use remains well within our plan.

There has been good progress in FY03 on installation. We have assembled the leadership of the installation team and are preparing to complete the next levels of staffing over the next two

months. In January during an accelerator shutdown period, good progress was made installing NuMI equipment in the accelerator tunnel.

More specifically for the month of March 2003, engineering and design work on the Technical Components continued to proceed well. All major designs and drafting are now complete. Design and drafting continues on some minor integration issues and for small components not planned for fabrication until next year. Four Level 3 milestones were met this month. The project remains somewhat ahead of schedule. The neutrino beam production target was received from IHEP in Russia and successfully vacuum tested to ensure that there was no damage during shipment.

Installation of the Far Detector at the Soudan Underground Laboratory continues to progress extremely well. The installed portion of the detector is routinely collecting physics data from cosmic ray neutrino interactions while it awaits beam. During March MINOS collaboration physicists and Soudan minecrew staff completed assembly of additional detector planes. At the end of this month 445 planes (of the project's total of 484) had been installed.

More detailed information on the project's progress and status in March follows in the rest of this report.

III. MASTER SCHEDULE AND FUNDING SUMMARY

The NuMI DOE Project Master Schedule is shown in Figure 1.

The DOE baseline milestones are shown in the figure as solid squares. These fixed milestones are defined in the DOE Project Execution Plan and the Baseline Change Proposal approved in December 2001. Shown as diamonds on the same line are the project's baseline projected dates for achieving the milestones. Actual dates of achieving milestones are shown as inverted black triangles.

Our actual progress is indicated by black 'thermometer' lines within the horizontal (baseline schedule) bars.

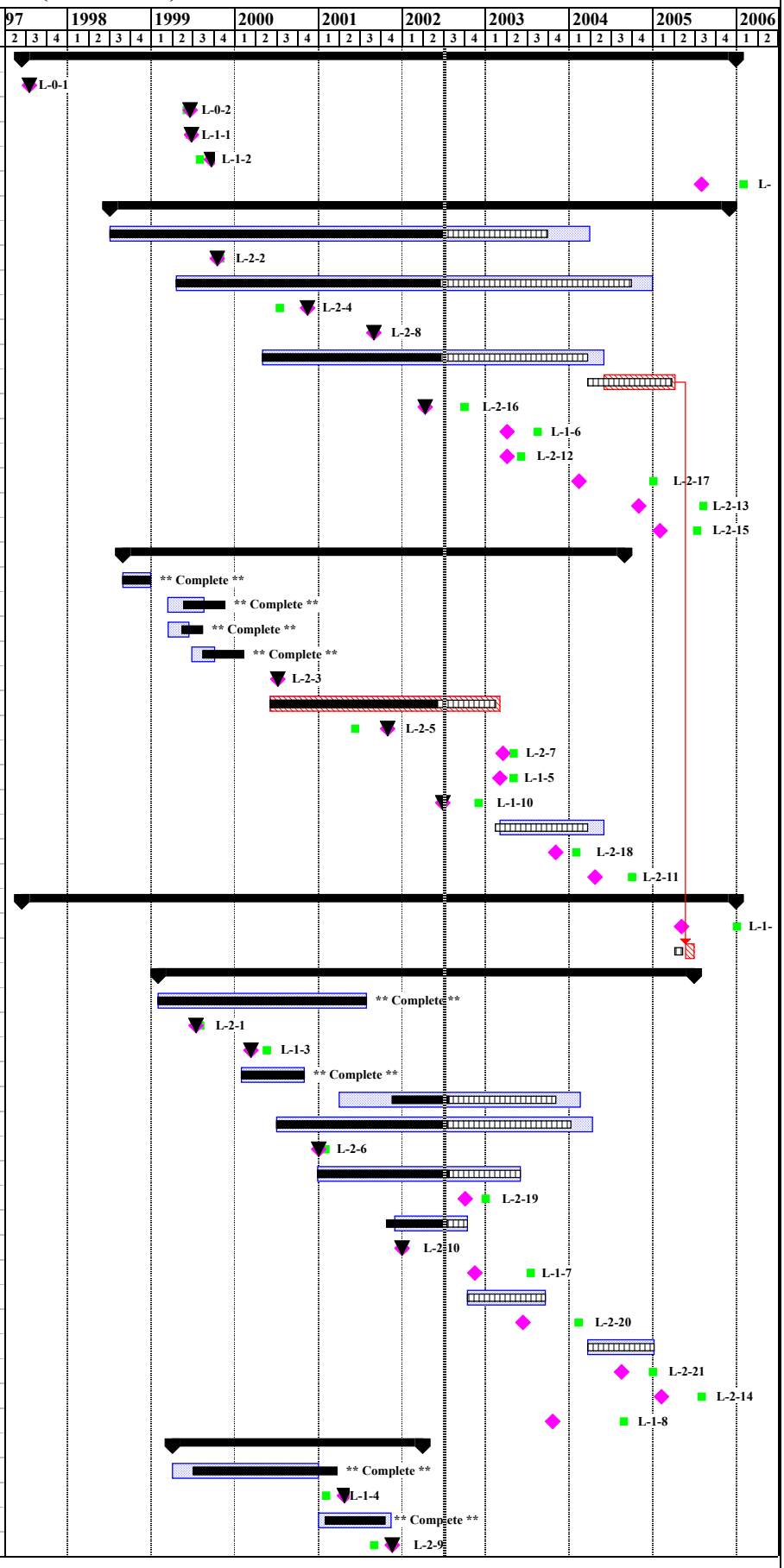
A Table titled "DOE Milestones vs. Current Forecast" follows immediately after the Project Master Schedule. That table lists all the approved Level 0-1-2 DOE milestone dates along with the project's current (and previous month's) forecast for achieving them. The list is sorted by DOE Milestone date. Milestones with forecast dates that have changed significantly in the last month are discussed in Section VIII of this report.

As always the TEC and OPC profiles are presented in the Funding Summary.

NuMI Project
(Fiscal Years)

5/9/03

WBS	Description
	Critical Decisions
	CD-1 Approve Mission Need
	CD-2 Approve Baselines
	CD-3a Start Limited Construction
	CD-3b Continue Construction
	CD-4 Start Operations
1.1	**Technical Components**
	Tech Components Design
	Top of Soudan #8 Mineshaft Located with GPS
	Tech Components Construction
	High Current Pulse into Prototype Horn
	Magnets for MI Stub Refurbished
	Pre Bene Occup Tech Components Installation
	Post Bene Occup Tech Components Installation
	Technology Choice Made for Muon Monitors
	Inner & Outer Conductors for First Production Horn Assembled
	Lambertson & C-Magnets Assembled & Tested
	Complete Installation of Horn Power Supply
	First Horn Installed
	MI Stub Installation Complete
1.2	**Conventional Construction**
	Facility Construction Title I Design Phase
	Facility UG Construction Title II Design Phase
	Site Prep & Util Title II Design
	Execute Site Prep & Util (Site Work) Sub-Cont
	NTP Issued for Fermilab Underground Subcontract
	Execute Fermi Underground Sub-Cont
	Fermilab Underground Construction 50% Complete
	Near Detector Hall Excavation Complete
	Target Hall Excavation Complete
	Service Building & Outfitting Bid Package Out
	Svc Bldgs Erect & Outfit
	Target Service Building Shell Complete
	Beneficial Occupancy of Service Buildings at Fermilab
1.3	**Project Management**
	Start Commissioning Beam Line
	System Commissioning
2.0	**MINOS Detector Construction**
	4 Plane Prototype
	MINOS Steel Purchase Subcontract Awarded
	Far Detector Prototype Erected
	Final Detector Design
	Near Steel Procurement
	Far Steel Procurement
	CalTech Factory Commissioned
	Scintillator Module Production
	75% Scintillator Produced
	1st Super-Module Installation
	Cosmic Rays Observed in Far Detector
	First Far Detector Super Module Complete & Tested
	2nd Super-Module Installation
	Near Detector Plane Pre-assembly Complete
	Near Detector Installation
	Start Commissioning with Both Far and Near DAQ
	Near Detector Complete & Tested
	Far Detector Complete & Tested
3.3	**Soudan Cavern**
	Soudan Cavern Excavation
	Far Detector Excavation Complete
	Soudan Cavern Outfitting
	Outfitting of Far Detector Enclosure Complete



Project: NuMI_Master_Sched
Date: 5/9/03

Baseline Task | Summary Task | FNAL Current Projection | FNAL Forecast
Critical Task | DOE Baseline Milestone | Milestone Complete | Task Status

DOE Milestone vs Current Forecast
(Sorted by DOE Milestone Date)

5/9/2003

Milestone Description	PEP Milestone #	DOE Milestones (As of 12/2001)	Last Month's Forecast Milestone (2/2003)	Current Month's Forecast Milestone (3/2003)	DOE Milestone Variance (Cal Days)	Monthly Variance (Cal Days)	Notes
CD-1 Approve Mission Need	L-0-1	3/17/1997	3/17/1997	3/17/1997	0	0	Complete
CD-3a Start Limited Construction	L-1-1	2/15/1999	2/23/1999	2/23/1999	(8)	0	Complete
CD-2 Approve Baselines	L-0-2	2/17/1999	2/17/1999	2/17/1999	0	0	Complete
CD-3b Continue Construction	L-1-2	3/31/1999	5/21/1999	5/21/1999	(51)	0	Complete
MINOS Steel Purchase Subcontract Awarded	L-2-1	4/1/1999	3/15/1999	3/15/1999	17	0	Complete
Top of Soudan #8 Mineshaft Located with GPS	L-2-2	6/28/1999	6/16/1999	6/16/1999	12	0	Complete
Far Detector Prototype Erected	L-1-3	1/17/2000	11/10/1999	11/10/1999	68	0	Complete
NTP Issued for Fermilab Underground Subcontract	L-2-3	3/6/2000	3/6/2000	3/6/2000	0	0	Complete
High Current Pulse into Prototype Horn	L-2-4	3/14/2000	7/14/2000	7/14/2000	(122)	0	Complete
CalTech Factory Commissioned	L-2-6	9/29/2000	9/1/2000	9/1/2000	28	0	Complete
Far Detector Excavation Complete	L-1-4	10/2/2000	12/22/2000	12/22/2000	(81)	0	Complete
Fermilab Underground Construction 50% Complete	L-2-5	2/6/2001	6/29/2001	6/29/2001	(143)	0	Complete
Magnets for MI Stub Refurbished	L-2-8	4/30/2001	4/30/2001	4/30/2001	0	0	Complete
Outfitting of Far Detector Enclosure Complete	L-2-9	4/30/2001	7/19/2001	7/19/2001	(80)	0	Complete
Cosmic Rays Observed in Far Detector	L-2-10	3/22/2002	8/31/2001	8/31/2001	203	0	Complete
Technology Choice Made for Muon Monitors	L-2-16	5/30/2002	12/10/2001	12/10/2001	171	0	Complete
Service Building & Outfitting Bid Package Out	L-1-10	7/30/2002	2/25/2002	2/25/2002	155	0	Complete
75% Scintillator Produced	L-2-19	8/30/2002	5/24/2002	5/24/2002	98	0	Complete
Near Detector Hall Excavation Complete	L-2-7	12/30/2002	8/30/2002	8/30/2002	122	0	Complete
Target Hall Excavation Complete	L-1-5	12/30/2002	10/4/2002	10/4/2002	87	0	Complete
Lambertson & C-Magnets Assembled & Tested	L-2-12	2/1/2003	10/31/2002	10/31/2002	93	0	Complete
First Far Detector Super Mod Complete & Tested	L-1-7	3/15/2003	7/24/2002	7/24/2002	234	0	Complete
Inner & Outer Conductors for First Production Horn Assembled	L-1-6	4/14/2003	2/5/2003	2/5/2003	68	0	Complete
Target Service Building Shell Complete	L-2-18	9/30/2003	7/7/2003	7/7/2003	85	0	
Near Plane Pre-assembly Complete	L-2-20	10/10/2003	12/17/2002	12/17/2002	297	0	Complete
Far Detector Complete & Tested	L-1-8	4/25/2004	9/10/2003	9/10/2003	228	0	
Beneficial Occupancy of Service Buildings at Fermilab	L-2-11	5/31/2004	12/22/2003	12/22/2003	161	0	
Start Commissioning with Both Near and Far DAQ	L-2-21	8/30/2004	4/1/2004	4/1/2004	151	0	
Complete Installation of Horn Power Supply	L-2-17	9/1/2004	10/6/2003	10/6/2003	331	0	
MI Stub Installation Complete	L-2-15	3/11/2005	8/16/2004	8/16/2004	207	0	
Near Detector Complete & Tested	L-2-14	3/31/2005	11/4/2004	11/4/2004	147	0	
First Horn Installed	L-2-13	4/7/2005	6/2/2004	6/2/2004	309	0	
Start Commissioning	L-1-9	9/1/2005	12/6/2004	12/6/2004	269	0	
CD-4 Start Operations	L-0-3	9/30/2005	1/14/2005	1/14/2005	259	0	End of Commissioning

IV. FUNDING SUMMARY (K$)

Funding Summary (as of 03/31/2003), amounts in thousands

YEAR	TEC (NuMI Facility) Appropriations	OPC (MINOS, Soudan) Obligations
		Actual costs through FY02. Plan from Baseline Change Proposal
Prior FY's	0	1,417 actual
FY98	5,500	2,348 actual
FY99	14,300	4,114 actual
FY00	22,000	11,324 actual
FY01	22,949[1]	13,598 actual
FY02	11,400	17,227 actual
FY03	19,842[1,2,3]	9,672
		Future Funding Plan
FY04	12,500[2]	2,000 balance
FY05	751[2,3]	500
TOTALS	**109,242**	**62,200**

Note [1]: FY01 Rescission removed $51K from plant line and $26K from OPC. We planned the restoration of these funds in FY03.

Note [2]: FY03, FY04, and FYY05 plant line funds as recommended for inclusion in the Baseline Change Proposal by the September DOE Review and approved in December 2001. This is the $33.042M in additional funding in the rebaseline proposal from Project Management.

Note [3]: FY03 Rescission removed $251K from plant line. We show the restoration of these funds in FY05.

TEC Funding Appropriated,
Not yet authorized

9,042 Reflects $251K removed from FY03. See Note 3 above.

Total TEC funding authorized

86,949

TEC Obligations to date, (Not including requisitions in progress)

84,764 54,838 **OPC Obligations to date**

TEC Funding authorized but not obligated

2,185

V. NARRATIVE HIGHLIGHTS

MANAGEMENT HIGHLIGHTS – G. Bock

Three Change Requests (CRs) were processed for inclusion in this report. CR 255 reduced scope of WBS 1.1 by ($353K) eliminating some spare equipment whose costs had been carried on the project. CR226 increased the WBS 2.5 budget by $199K to cover cost variances that were accumulated during the near detector plane pre-assembly. Finally CR 223 increased the budget of WBS 2.3 by $28K as a result of schedule adjustments for electronics work.

Four Level 3 milestones were met this month. A Level 3 Manager's review of control system requirements was completed (L-3-155). The neutrino beam production target was received from IHEP in Russia and vacuum tested to ensure that there was no damage during shipment (L-3-196). The mechanical and electrical designs and drawings for the kicker magnet and power supply were completed (L-3-157, L-3-172).

Preparations were made for the Director's Review of Installation to be held in April.

FY03 funding for the NuMI project was appropriated in March. A $215K rescission lowered the available plant funding for this year to $19,842K as indicated in Section IV of this report. We expect the impacts to be very minimal.

The Project continues to report its progress against its own plan, which has a more aggressive schedule than that required by DOE milestones. The Project Support staff has developed a chart that provides the DOE NuMI Project Manager with a progress report against the DOE milestones.

Procurement Highlights – R. Huite

NuMI Tunnels and Halls (Contract Closeout Team)

The Co-leaders of the NuMI Tunnels & Halls Contract Closeout Team are R. Huite and C. Laughton. The closeout team is responsible for the timely and effective closeout of the S. A. Healy contract. This team is organized with several sub-groups bringing together a variety of as-needed expert help, i.e., a negotiating group, claims and legal strategy expertise, geo-technical experts, cost estimators, auditors, procurement, etc.

Procurement support to the NuMI Tunnels and Halls Closeout Team continued to provide oversight of the subcontract terms and conditions, tracking of invoice/payment, and ensuring compliance with the Fermilab Procurement Policy and Procedures manual, and continues to be provided by the NuMI Procurement Administrator. The NuMI Senior Procurement Coordinator attends the NuMI Project Manager's weekly staff meeting (each Monday); a weekly closeout status meeting (each Monday) with the NuMI Manager (G. Bock); a weekly status meeting with the BSS/Procurement Manager (J. Collins); and a weekly meeting (each Tuesday) with the BSS/Procurement Manager and DOE-FAO Procurement Specialist (J. Chapman). In addition, meetings with Head, BSS as may be necessary.

The NuMI Tunnels and Halls Closeout Team consisting of Fermilab (C. Laughton & R. Huite); W. D. Wightman Company (Toby Wightman); Pinnacle One (R. Helmuth); and Montgomery Watson Harza (S. Heinlein) continued to discuss/evaluate S. A. Healy claims and other general correspondence.

Four of the six recommendations have been received from the Disputes Review Board (DRB):

(1) DRB Recommendation No. 3, August 2, 2002 – Geocompostie Drainage Strips/Shotcrete (FNAL No. 40), dated August 2, 2002 (Hearing Date – May 9, 2002).

(2) DRB Recommendation No. 1, August 21, 2002 – Enhanced Water Treatment Facilities (FNAL No. 14), dated August 21, 2002 (Hearing Date – April 4, 2002).

(3) DRB Recommendation No. 3(2), November 12, 2002 -- Carrier Tunnel Clay Seam DSC at Station 4+20 (SAH No. 17/FNAL No. 53 (Hearing Date – April 4 & 5, 2002)

(4) DRB Recommendation No. 4, November 12, 2002 -- MINOS Shaft Excavation Vertical DSC (SAH No. 32/FNAL No. 20) (Hearing Date – May 9 & 10, 2002 and rebuttal July 9, 2002).

The following two DRB recommendations are pending:

(1) Decay Tunnel – Clay Seams and Groundwater/TBM (SAH NO. 69/FNAL No. 63) presented at the 3rd DRB Hearing on September 17, 2002.

(2) The Safety Stoppages & Constraints (SAH No. 68/FNAL No. 62) was presented at the 4th DRB Hearing on November 12 and 13, 2002.

Pursuant to the DRB-MOU, recommendations are due within 30 days after receipt of all applicable documents. The Chairman, DRB advised Fermilab and S. A. Healy on March 7, 2003, that the above two recommendations were not complete, and no future date was provided. A window for a future DRB Hearing has been set aside for the week of July 14th.

No claim negotiation meetings were held between NuMI Tunnels and Halls Closeout Team and S. A. Healy during the month of March 2003. On March 5th, a meeting took place at Fermilab with S. A. Healy representatives to discuss the shielding fill issue(s). No other meetings were held between the parties during March 2003. Meetings are scheduled for April 3rd and April 17th between the parties.

During March 2003, the NuMI Closeout Team members met with three outside firms to begin discussions related to tasking these firms to assist Fermilab with claim analysis/audit. In addition, an outside legal firm has been selected to assist the NuMI Closeout Team.

The S. A. Healy's subcontract No. 527522 totals $34,629,667 through Supplemental Agreement No. 16, an increase of $18,847. The total amount invoiced from S. A. Healy to date is $34,480,116 through and including Invoice No. 68. Payment has been made in the amount of $31,621,265.36 and $2,858,850.64 has been retained.

There are a total of 60 claims/change orders open or unresolved (this does not include eleven (11) change orders denied).

The following is a summary total of the numbered correspondence (i.e., letters and field communications/memorandums) that have been entered into the NCMO tracking database:

SAH to NuMI Numbered letters – 1255
NuMI to SAH Numbered Letters – 806
NCMO General – 733

NuMI Surface Buildings and Outfitting

The subcontract was awarded to Ragnar Benson, Inc. (RBI), of Park Ridge, Illinois in the amount of $17.88 million. The NuMI SB&O Construction Manager for this subcontract is Elaine. McCluskey, per delegation by Michael Witherell's letter, effective 16-Sep-02. The Business Services Section/Senior Procurement Administrator is R. Cibic. Five supplemental agreements have been issued:
Supplemental Agreement No. 1 – Temporary Water Treatment at MINOS;
Supplemental Agreement No. 2 – Power Clarifications and back-up Generator;
Supplemental Agreement No. 3 – Additional Carrier Utilities and LCW Pipe Deliver (offset by Value Engineering Credits)
Supplemental Agreement No. 4 -- EC-09, EC-10, EC-11, EC-12, EC-13, EC-14, & EC-15.
Supplemental Agreement No. 5 – EC-4, EC-21, EC-25, EC-8, & EC-84

The RBI's subcontract No. 546631 totals $18,393,891.80 through Supplemental Agreement No. 5 of $159,477.99. Total amount invoiced from RBI to date is $2,263,723.36 through and including Invoice No. 8706 dated 01/31/2003. Payment has been made in the amount of $2,037,351.01 and $226,372.34 retained (at ten percent).

NTP1 (October 1, 2002) provided for procurement and planning activities to include:

(1) Submission of technical and subcontract submittals including but not limited to: required schedules, safety and quality control submittals, long-lead item shop drawings, and critical item shop drawing submittals.
(2) Procurement of initial critical and long lead items after coordinate submittals have been approved.

NTP2 (November 22, 2002) authorized commencement of work as required by the terms and conditions of the subcontract. RBI continued utility work at the Target (MI-65) Service Building site.

The subcontract incorporates two incentive programs:

(1) Percentage of fieldwork completed satisfactorily: if Fermilab finds that satisfactory progress is being achieved in the field, Fermilab may reduce the percentage retained based on the schedule contain in the subcontract.

(2) Safety performance record: in rewarding the subcontractor for accomplishing the work described within the subcontract without injuries, lost workdays, and/or fatalities within the contractual requirements of the subcontract, Fermilab will reward the subcontractor for fieldwork accomplished over four periods established with the subcontract.

The following is a summary total of the numbered correspondence (i.e., letters and field communications/memorandums) that have been entered into the SB&O tracking database:

SBO to RBI – 148
RBI to SBO -- 258
Field Memos (FM) – 0
Field Communications (FC) – 0
NCMO General – 59
Internal – 48

NuMI Technical Components

The NuMI Management staff responsible for technical components and the Procurement Coordinator continued to work closely to monitor NuMI requisitions pending award(s) and the status of purchase orders.

NuMI FACILITY AT FERMILAB

TECHNICAL COMPONENTS (WBS 1.1) – B. Baller, N. Grossman

Overview

Four Level 3 milestones were met this month. A Level 3 Manager's review of control system requirements was completed (L-3-155). The neutrino beam production target was received from IHEP in Russia and vacuum tested to ensure that there was no damage during shipment (L-3-196). The mechanical and electrical designs and drawings for the kicker magnet and power supply were completed (L-3-157, L-3-172).

Numerous technical and safety reviews have been completed during the course of design and construction, however a comprehensive list of all components needing review did not exist prior to March. We have adopted the hazard screening thresholds developed years ago in the Research Division to identify systems that warrant an independent review. This system was successfully used as a basis for operating the Fixed Target area. The head of the NuMI Safety Review Committee was apprised of these efforts.

Integration and Installation – R. Andrews

During the month of March, discussions with the management of the Mechanical Support Department of the Beams Division continued. The intent of these discussions was to identify the needs of NuMI, and to develop the plan for bringing the resources of the Mechanical Support Dept. to bear on this need. We have identified a point person from MSD (Joel Misek) who is now working with us to provide Task Manager support for the upcoming Summer Shutdown,

help identify a Floor Manager for MI-65, and bring some engineering effort into the Absorber task for completing an Installation Specification, and getting a work plan in place.

An additional person on the NuMI Installation Team has been identified: Dave Augustine will function as the MI/Beams Division Operations Support person, and as such will be a single point of contact for activities in the Main Injector tunnel during the installation periods of accelerator shutdown. This individual has begun to familiarize himself with the scope of the task and the division of effort between the '03 and '04 shutdowns.

We also spent some time developing a part of the installation process as a result of the lessons learned during the January Shutdown. We must have a step that looks at installation readiness of devices. As such, we are working with the ES&H Coordinator to expand upon a process that is already in place for a) completing conceptual reviews, b) completing a design review, and c) examining the readiness for commissioning. An installation checkpoint is now inserted between b) and c) to look at installation readiness. Questions to be asked at this point are: have proper reviews been completed, and are all the resources in place so that the task may proceed smoothly.

Work continued on organizing the tasks to be completed during the upcoming summer shutdown, and some effort was also spent preparing for the April Director's Review of Installation.

Primary Beam (WBS 1.1.1) – S. Childress, C. Moore

Overview

All design and drafting for the kicker magnet and load system are now complete. Fabrication continues to proceed for both.

Engineering design review feedback has been received for both the MI60 area magnet stand support upgrade and for magnet stands in the NuMI extraction enclosure. Review feedback has been positive in both cases.

Good progress continues to be made with Technical Division magnet refurbishment, drafting layout and magnet stand design for the Pretarget beam enclosure, and Profile Monitor beam instrumentation.

Magnets and Stands

Technical Division efforts continue for refurbishment of B2 dipoles, and for fabrication of the new IDH corrector magnets. 3Q120 quadrupoles to be refurbished have been delivered to the Technical Division magnet facility, with checkout in progress. Coil packages for the corrector magnets are being completed at the rate of three per week. Good progress is being made in all areas, with expected completion by the June 2003 schedule date.

Review of the MI60 area magnet stand support upgrade and magnet stand designs for the Extraction enclosure have identified only a few additional items of detail to be addressed.

Fabrication detail drawings are well advanced, and should be completed to enable procurement to proceed in April.

Profile Monitors – S. Kopp

Significant progress has been made in assembly of the prototype Ti foil secondary emission profile monitor. Vendors have been able to successfully prepare the 5 microns thick segmented foil strips. Also, mounting of the strips on the support frame along with accordion style crimps in the foil, to take up slack due to beam heating, has been accomplished. This design approach has been adopted from a CERN design. The vacuum can assembly for the prototype monitor has also been completed.

Kicker Magnet System – C. Jensen

All design and drafting for the kicker magnet and load system is now complete. Fabrication of kicker magnet body assemblies has been completed. Electro-plating of several components is in progress.

Flow tests are ongoing for the fabricated kicker-cooling skid at the F17 service building. This test location was chosen to enable load power tests prior to completion of the NuMI kicker power supply. A problem has been found with delivered perforated silver foil which is to be used as spacer material to compensate for small mechanical variations in load resistor size. The delivered foil is thinner than specification, and will be replaced by the vendor. Fabrication of components for the first two load assemblies is now 75% complete. On completion, these assemblies will be tested thoroughly prior to production fabrication of the remaining load assemblies.

Beam Permit System – R. Ducar

New Beam Permit System hardware remains installed and in operational test at various locations. Operational performance, especially at Mini-BooNE, continues to be excellent. The review of NuMI Controls Requirements by L3 Managers completed this month (ref. WBS 1.1.8 section of this report) has been effective in determining the type and number of conditions that will be processed by the NuMI Beam Permit System.

Neutrino Beam Devices (WBS 1.1.2) – J. Hylen, D. Ayres, K. Anderson, A. Stefanik

Magnetic Focusing Horns

Horn Test Stand. Revised power supply stripline links are still in fabrication; should be ready to resume power testing in April.

Production Horns.

Horn 1 Outer Conductor. Horn 1 outer conductor has been successfully anodized and delivered to Fermilab. Work has begun on silver plating the critical contact surfaces for stripline and upstream end cap connections.

Horn 1 Inner Conductor. Horn 1 inner conductor electro-less nickel processing is complete. The finished conductor will ship to Fermilab around 4/4/03.

Horn 1 Assembly. Prep work has started for final assembly of horn 1 inner and outer conductor. Horn assembly is expected to be completed by its L-3-174 milestone date of 8/7/03.

Horn 2 Assembly. Horn 2 final assembly work continues with efforts focused on spider support and water-cooling hardware assembly. All assembly work is expected to be complete by the end of April, achieving milestone L-3-156 "Production Horn 2 Assembly Complete" before its 5/1/03 milestone date. This also keeps us on track to achieve the milestone L-3-190 "Complete Horn 2 Operational Testing in Test Stand" by its 8/22/03 L3 milestone date.

Horn Integration. The majority of work is complete regarding details of horn 2 interface issues (e.g., water and signal line routing, water line electrical isolation ceramics, thermocouple positioning and interface, and provisions for survey) with only minor water tank mounting details to be completed. Outstanding issues not on the critical path include the interface between the hot component work cell positioning tables and the respective mounting points of horn 1, horn 2, and the target/baffle carrier, and final integration issues regarding horn 1/ module interface.

Magnetic Field Monitor. Parts for the magnetic field probes are on order; delivery of all hardware is expected in April.

Target

Target construction is finished, and the target was shipped to FNAL from IHEP in February. Acceptance tests that assured the target was not damaged in shipping were conducted in March. This achieves milestone L-3-196 well before its milestone date of 12/19/2003. We have begun vibration tests of the target to determine if a spider support is necessary or can be eliminated.

Modules

Horn 1 Module. Trial fit of hardware for horn 1 module continues prior to sending out steel parts for electro-less nickel corrosion barrier application. The main supporting top pieces for the module have been trial fit and sent out for electro-less nickel corrosion barrier layer processing. Assembly efforts for horn 1 module are expected to ramp up as horn 2 and horn 1 assembly progresses and nears completion. Final assembly requires an assembly stand; the stand design is under revision, as the first version would have exceeded allowable floor loading. The milestone L-3-194 "Assembly of Horn 1 Module Complete" should be achieved by its milestone date of 10/7/03.

Horn 2 Module. Work is progressing well on horn 2 module mainframe fabrication at Orient Machine in Harvey, IL. Discussions with the vendor indicate that the main structure welding is nearly complete and grouting is underway. Final hole machining will be completed after all welding and grouting operations. Piece part and assembly drawings for the rest of the module were finished in March, although checking of the drawings will continue in April.

Target/Baffle Module. Fabrication of the target/baffle module continues. Machining operations on the module end pieces are nearly complete, with machined features meeting tolerance requirements. Module sidewall machining is complete. Final welding and inspection is expected to be complete by 4/11, after which the part will be sent out for painting. It is expected that the finished main frame will be shipped to Fermilab around the end of April. Piece part drawings for the rest of the module were completed in March. Work on assembly drawings and checking of the part drawings continue into April.

Remote Clamp / Stripline block. Testing of the prototype remote clamp was on hold while the horn test stand stripline link was repaired. The module stripline block drawing set is still waiting for minor modification (addition of a few bolt holes) and checking. The drawing set was completed for the assembly and transportation stand for the stripline block.

Target Carrier and Baffle

Drawings for most of the target/baffle carrier components are still awaiting checking; it appears the engineer will be available to do the checking in April.

The graphite for the baffle was received in March. It will be shipped to IHEP in April for baffle fabrication.

Horn Cross Hairs Alignment System

The drawings of the Horn 1 and Horn 2 crosshairs and their mounting brackets are finished, and P.O.s are about to be placed for fabrication. The crosshairs should be installed on the horns for the pulse testing on the horn test stand.

Target Hall Shielding / Cooling

Air Cooling System. We updated the filter specification for the new air system duct layout and obtained another budget quotation for it. We obtained a quotation for the air seals to be used between the concrete covers and submitted the material to Safety for approval with respect to fire safety.

Steel Shielding. We started fabricating production T-blocks. We continued updating drawings for the T-Blocks and shielding. We requested vendor quotations to cut the survey and BLM holes in the T-blocks.

Concrete Covers. We developed a layout for the concrete covers. Details of the seal around the stripline penetration will be filled in after the stripline design is finished. The layout of the concrete covers and the air seals are the remaining tasks to achieve the L-3-171 milestone "Upper Chase Shielding Fabrication and Installation Drawing Set Complete" (milestone date 9/29/03).

Carriages. Carriage fabrication is under way.

Remaining Design Work. Drafting continued intermittently on the upstream shielding block wall. The drawing set will be the last item necessary for the 5/26/03 "Lower Chase Shielding

Fabrication and Installation Drawing Set Complete" L-3-158 milestone. We obtained current pricing for the masonry blocks used to build the upstream wall.

Installation Plan. We laid about 30 feet of track in the New Muon building and completed testing moving the transporter cart with a side-mounted hitch. We completed the drawing that specifies pit floor and equipment ledge survey points needed for installation. We requested that these points be surveyed during the FESS pit liner wall survey in April.

Radioactive component handling

Component positioning system. Assembly of the lift table positioning system continued intermittently in March, as fill-in work between higher priority efforts.

Hot cell. The two large steel plates for the upstream and downstream walls are waiting to be cut to their final dimensions. Purchase requisitions are being assembled for the rest of the remote door motion system.

Cameras. No work on the camera system for remote handling has been done since the physicist involved retired.

Remaining Design. The design of a transport support for the work cell door during installation is still in the work queue.

Instrumentation/Electronics

The purchase of electronic components needed to read out target hall instrumentation continued in March, including an amendment to an MOU to have some integrating sample and hold cards produced at ANL. Preparations are under way to test the data acquisition system, especially its interface to the Main Injector ACNET system, in late spring in MI-8. This test will make use of many of the actual devices and readout electronics that will be used in the target hall. We started selecting the PLC modules that will be used to monitor and control the target hall re-circulating air system.

Administrative / Project Management

Milestones for the next six months are called out in the above text. Critical tasks are proceeding ahead of or on the base schedule; the mainline horn and target efforts are proceeding well, and good progress continues on acquiring the main shielding.

Technician, engineering and drafting resources are at reasonable levels. Physicist resources are at an acceptable level, although we have yet to cover the camera system.

In order to safely assemble and install the stripline remote clamp shield block a fairly sophisticated stand must be designed and built; this was not in our WBS. The final design and drawing set of the modules for horn 2 and target/baffle are taking longer than estimated. This is causing significant cost variances in March and April. This should be partially offset in April, as the horn 2 and target/baffle mainframes are coming in significantly under budget.

Power Supply Systems (WBS 1.1.3) – G. Krafczyk

Overview

Design effort for the kicker power supply (PFN, etc) is now complete. Drawings (All 115) will be checked over the next several weeks.

Further discussion took place as to the MI-60N and MI-65 service building pulsed power distribution transformers. 2.0MVA transformers were ordered to cover the added pulsed load allowing the transformers to be run at ½ the Peak Power plus the RMS power of the installed load.

Horn Power Supply - K. Bourkland

The parameter pages for the IRM (Internet Rack Monitor) have been completed and proper data transmission through the control system verified.

Available MADC channels in MI-8 for PEI control and monitoring have been identified. The Camac parameter page remains to be constructed and verified, but it is anticipated this will be completed in the coming month

Transmission Lines - B. Boettinger

Work has been started on designing the sections of stripline that pass thru the 28' penetration from the P/S room to the hall as well as the connector piece that goes from the main hall T/L to the individual modules.

The shielding block section of the stripline will now need a minor redesign due to concerns over galling the aluminum liner from using the "wedge design" clamps in that area, due to thermal expansion stresses. The redesign involves plating the steel in the chase areas of the shielding block and eliminating the aluminum liner altogether, as well as some of the clamps.

The MI-8 setup has to be modified due to clamping problems that have been observed in the ceramic areas of the stripline. These concerns have been addressed and improvements are being implemented. The issue of the misalignment of the MI-8 T/L to remote clamp has been addressed and new parts should be installed in the mid-April time frame.

Extraction Kicker Power Supply - C. Jensen

The PFN assembly mechanical drafting effort is approximately 98% complete. Detail checking of all 115 drawings has begun. Details on oil tank cooling have not been done yet. The charging power supply specification is final and the order has gone out for bid. Several problems were found and corrected in the simulation of the power supply and magnet system. Measurements made on the prototype PFN were used to match a simulation of the prototype PFN. Prediction of the simulated response with the full model now agrees with an engineering understanding of the response.

Temperature measurements of the service building MI_60S and certain exact tunnel locations continue. The service building temperature has a range of about 20 F over the last month. This

will require some temperature control of the PFN tank to keep it more constant. The tunnel temperature at Q602 seems to roughly track the previously monitored temperature at Q601. The monitor at Q602 shows a slightly larger variation, +/- 2F, than at Q601, namely +/- 1F. This effort has also helped in using the temperature sensor and amplifier for the final load cooling skid.

The EE Support Dept has continued with the detailed review of the electrical design.

Conventional Power Supplies - S. Hays

All of the 20 kW Quad power supplies have been located and moved to the North end of MI-60. The additions to the 480 VAC power and load connections will be completed when the electricians are available. Modifications to bring them up to the level necessary to connect to the MI controls system are being completed at MI-60. The PEI supply for the LAM60 circuit has been moved into location at MI-60N. Filter design work for the smaller inductors is being completed and we are ready to order parts.

Decay Region & Hadron Absorber (WBS 1.1.4) – R. Bernstein, A. Wehmann

The near term milestones coming due are "Purchase Order for Core Modules, Aluminum Submitted", 6/2/03 and "Core Back-shielding Steel Fabricated", 6/30/03. Progress on these is reported below.

Ernie Villegas (PPD Engineering) listed corrections he wanted made to the absorber core drawings. Gary Smith (PPD drafting) made the corrections and has submitted the revised drawings to Ernie for further review. Once this cycle is complete, the drawings will undergo a checking cycle within PPD drafting. During this time the core drawings will be also be reviewed by the WBS 1.1.4 Co-manager(s). We are on track for accomplishing the associated milestone on time.

Half of the aluminum for the core modules has arrived at the laboratory, in the form of saw-cut pieces with nominal dimensions 51" x 51" x 12". The remaining four pieces are expected to arrive within a week or so. These eight pieces will be shipped to the winning bidder for the fabrication work (e.g. gun-drilled cooling passages internal to each module).

The steel for the back end of the absorber core is being flame cut from CCS pieces now at the Fermilab railhead. The result will be ten pieces with nominal dimensions 51" x 51" x 9.1". Plans for drilling the 1.5" diameter clearance holes (for the 32 RAW pipes) in these ten pieces are being made; that work will be done at the Meson Assembly Building.

Fabrication of the end caps for the decay pipe is complete. A coat of primer paint on the steel was the last step to be accomplished.

Bob Bernstein and Dave Pushka met on 3/27/03, to discuss the next round of work on the specification for the absorber installation contract. Bob Bernstein is making the necessary modifications.

The assembly drawings for the absorber do not show the 6" wide insertion slot for the DS hadron monitor, in the concrete block shielding cave upstream of the absorber. Making that

modification requires a small investment of time by Ernie Villegas (on the 3D Ideas model). Following that, Gary Smith can modify the assembly drawings appropriately.

Some layout work remains in the absorber cavern drawings, i.e. decay pipe vacuum pipe routing, absorber RAW pipe routing to the manifold and labyrinth details.

Neutrino Beam Monitoring (WBS 1.1.5) – D. Harris, S. Kopp

Machining of hadron monitor components continued, with the thin lid having been completed this month. All of the electrical feedthrough parts are now machined. Yet to be completed are the lifting and positioning components. Welding of the gas vessel will begin in April.

The muon monitor tubes continued in assembly. All the tubes and trays were finally cleaned and ready for assembly this month. Only two tubes were actually assembled during March. Actual assembly work was stalled because of a broken piece of tooling required for the assembly. The tooling is now replaced, and assembly should resume. Impact on the schedule is probably slight because this time was used to finish many of the components used in the assembly.

The Wisconsin group began fabrication of the support structures for the muon monitors. Also they are commissioning a set of SWIC electronics to be used in testing and calibration of the muon detectors during the next 6 months. A SWIC was shipped to UT-Austin, and we are attempting to control it with the FNAL ACNET software. The Wisconsin group also finalized its plan for controls for the detector high voltages, and began work on two of the HV supplies.

Survey, Alignment & Geodesy (WBS 1.1.6) – W. Smart

The forms for the west side target hall wall were checked before the concrete was poured. The east side walkway (on top of the target hall wall) was checked. Seven proton beam magnets were referenced in March.

The survey engineer effort for NuMI in March was 2.0 mw, 1.5 for construction QA and 0.5 for magnet referencing.

Beamline Utilities (WBS 1.1.7) –D. Pushka

General

Piping for the upstream LCW system continues in the MI-62 service building under a fixed price contract. As of the end of March, the work is nearly complete. The only remaining activities are to perform the pressure testing and to grout the pumps in place.

As reported last month, proposed changes to the sump pump and cooling systems to be installed as part of the SB&O civil construction contract were reviewed. These changes, (known as revision 6), if adopted, will affect the design of the Absorber RAW, Decay Pipe RAW and MINOS LCW systems. It is not clear whether or not these changes will or will not be implemented and so further progress on these systems awaits resolution of that decision.

Upstream LCW System

Status of the piping in MI-62 Piping is reported above. In addition, claims for extras that are expected have been submitted by the contractor, reviewed, and negotiated. These claims result from inaccurate part counts on the drawing bill of materials (the number of fittings shown on the drawings was more than the number shown in the bill of materials), interferences in the building which caused changes to the piping layout, and out-of-roundness problems with the Fermilab supplied 6 inch stainless steel piping (these caused the contractor additional work to fit up the pipe to avoid high-low problems). The dollar amount of the claims is less than 10% of the contract value.

In summary, this system is moving well along, although there remains much work to be completed on the system after the piping contractor finishes. The next activity will be to purchase and install the instrumentation.

Final Horn Raw System

Carbon steel for the Horn 1 and Horn 2 skids has been fabricated. Pumps, heat exchangers, expansion tanks, fittings and valves have been ordered. Work to weld the piping has not started. Fabrication of the skids in MAB is going slower than the schedule predicted.

An engineering note for the Horn 1 and Horn 2 RAW systems has been assembled and reviewed. No significant problems were found.

Upstream RAW System.

Carbon steel for the Target RAW skid has been cut in New Muon Lab and welded in the main shop. Pumps, expansion tank, fittings and valves have been ordered. Work to weld the piping has not started.

The mechanical design for the Upstream (Target) RAW System is as completed as it can be without having the required flows and pressure drops identified. Once the required flows and pressure drops are identified, then some minor revisions to the drawings will be made.

Downstream RAW System.

Piping routing drawings for the piping between the absorber and the absorber RAW skid have been started, but not finished because the drawings showing the absorber core have not been finished.

Meanwhile, a need to generate a cost neutral CR to revise the number of RAW pipes between the absorber shielding and the absorber RAW skid has been identified. This CR will be initiated later. Once completed, the piping layout between the back of the absorber and the absorber RAW skid will be started.

Flow calculations for the engineering note have been completed for the Absorber RAW and Intermediate Systems.

Purchase requisitions have been submitted, specifications written, requests for quotation issued, and purchase orders placed for: the Absorber RAW pumps, Absorber RAW to Intermediate Heat Exchanger, Intermediate Pumps, and Intermediate to Pond Water Heat Exchanger.

Drafting for the absorber RAW skid and the absorber Intermediate loop skid have been requested, and work has started.

If adopted, the proposed changes to the SB&O installed sump pump and cooling systems will require re-design of the absorber intermediate system and the downstream portion of the decay pipe cooling system. Some equipment will need to be changed. Because of this pending change, the engineering notes for these systems have not been submitted for peer review.

In summary, on the Downstream (Absorber and Decay Pipe) RAW Systems, the mechanical design is well underway although the already purchased equipment may need to be replaced, and the peer review of the engineering notes has been put on hold pending the re-design work necessitated by changes to the cooling systems under the auspices of SB&O revision 6. This is a problem and it puts finishing these skids before beneficial occupancy in jeopardy.

Piping Installed Under SB&O

Piping for several systems in WBS 1.1.7 has been included in the SB&O contract with drawings and specifications prepared under the auspices of the WBS 1.1.7 system manager. In summary, this is satisfactory, but more frequent inspection of the installed piping, preferably by a person qualified as a level 1 NDE technician, would demonstrate due diligence in performing the quality assurance role of the laboratory.

Vacuum Decay Pipe Cooling

Piping routing drawings for the piping between the downstream end of the decay pipe and the downstream and the upstream decay pipe RAW systems were prepared, checked and signed off. This piping is included in the SB&O civil outfitting contract and installation of some of it has begun.

The status of the engineering note and equipment for the Vacuum Decay Pipe Cooling system is identical to that of the absorber RAW system. Specifically, major equipment has been sized and ordered. The engineering note has been completed, although the peer review has not been started because of the potential for significant system changes needed to accommodate the proposed changes to the SB&O sump and cooling systems (Revision 6).

Drafting for the vacuum decay pipe cooling skids has been requested, although work has not started. Again, decisions regarding the "revision 6" changes to SB&O affect this system. As such, timely progress on this system is being hampered.

Extraction and Primary Beam Vacuum System

A P&ID of the Extraction and Primary Beam Vacuum System has been submitted to Drafting (BD). Some vacuum instrumentation has begun to be installed in the MI-62 service building.

Jim Klen (BD/MSD) has been assigned to re-evaluate the vacuum design for all of the primary beam transport beam pipe. In March, Jim Klem generated the requisitions for the ion pumps. The power supplies for the ion pumps, which were believed to have been finished, apparently are not. According to Leon Bartelson, another 27 supplies need to be built. These are built in house and the engineer who preceded Jim Klem did not accurately initiate the number of supplies needed to Bartelson when Bartelson built the existing 11 supplies for NuMI and many supplies for MiniBoone. This poor communication is not acceptable. A corrective measure initiated by the WBS 1.1.7 system manager is to have BD/MSD generate an engineering note to document the system design, and then to have a peer review of said engineering note conducted.

Decay Pipe Vacuum System

Piping and Instrumentation Diagram is complete, the instrument list generated, and an informal quotation for the vacuum pumps received but no purchase requisitions generated.

Controls, Interlocks and Cable Installation (WBS 1.1.8) – R. Ducar

March saw the completion of the WBS 1.1.8 milestone for the L3 Manager Review of NuMI Controls Requirements. The needs of the revised beamline design were incorporated into the plan together with other known needs of the Project. Individual meetings were held with L3Ms to go over their associated details of implementation. Clarifications, corrections, and additions for the plan were incorporated during the course of the review and fed back to the L3Ms for final comment. The resultant plan has been distributed to various individuals and liaisons associated with the Project. An informational meeting was held with the Controls Networking Group to further explain the requirements. The Beams Division Controls Department is utilizing the information to plan their ordering and installation of necessary equipment. The current version of the controls plan has been posted on the Web for information. Other milestones remain on track.

The status of various cables under test by Jim Priest, the Laboratory's Fire Safety Engineer, was summarized. Emphasis was given for testing of a selected subset of submitted samples so that procurement may commence. Footage required for various cables is now well quantified. Dr. Priest's assistance in this matter continues to be invaluable.

A description of selected work activities that are considered appropriate for determination as non-covered Davis-Bacon activities was generated in March. The Project Management team reviewed the listing of these activities and their generalized and/or specific justifications before they were forwarded to the Project Manager. While this work is not a direct component of WBS 1.1.8 scope, it did demand the experienced knowledge of this L3 Manager. The developed document will eventually be transmitted to the DOE for a final determination.

CIVIL CONSTRUCTION AT FERMILAB (WBS 1.2) – D. Bogert

Overview

During March Ragnar Benson continued work in the two underground areas of the Service Buildings and Outfitting contract. Improved weather conditions permitted increased efforts on the surface at the Target (MI-65) site and at the MINOS site. At the MINOS site, the excavation

for building footings was completed, and some footings and foundations walls at MINOS were formed and poured. Excavation and installation of the shallow utilities at MINOS also resumed. The excavation and demolition of the "bearing collar" at the Target shaft was completed, and the excavation of the lower access corridor at the Target (MI-65) building was completed. In the Target Area below grade, outfitting work continued with completion of concrete placement for the Target Pit Liner and associated walkways. An improved support system for the concrete forms permitted this work to be completed without any re-occurrence of the form failure reported last month. In the Pre-Target and Carrier tunnel the rough-in of process piping and electrical service continued. In the Carrier tunnel the welding of the 12" Carrier beam pipe was completed. The in-place steel formwork for the emergency corridor roof in the Pre-Target area was completed, and the roof was poured. In the MINOS Hall and MINOS Access areas the installation of fire suppression sprinkler piping was completed. The in-place forming for the emergency corridor roof in the MINOS Hall and Access began.

During the excavation for footings at the MINOS site on March 6, an identified buried 480V conductor was nicked by a "pick" mounted on a backhoe. A stop activity order for excavation was issued. There were no injuries or property damage. Subsequently the site superintendent and an operator were removed from the project. After re-review of the Hazard Analysis for this work by all excavating staff, the stop activity order was removed and excavation was resumed.

Laboratory staff continued to monitor weekly progress using the Ragnar Benson schedule for performance of the contract work. During March the situation again deteriorated somewhat as measured against the approved project schedule that contains 340 work elements. At the end of March 106 work elements had been started, and 64 of those were completed. However, twelve work elements were not started after their respective "late start" dates and an additional twelve elements underway were late with respect to "late finish." This situation produces "negative float" and a consequent projection of a late finish with respect to the contract completion dates. In fact, an intermediate milestone ("Service Buildings footings and foundations complete") was missed on March 23 and remained incomplete at the end of the month. In early March Project Management requested that Ragnar Benson provide a revised schedule that would demonstrate schedule recovery and the capability to complete the contract on time. Ragnar Benson did submit a draft schedule revision that indicated that the above-mentioned milestone would be completed on April 19, and that other intermediate milestones would be met. Ragnar Benson has stated to Project Management that they do not expect a late finish and further stated that the draft schedule does demonstrate the capability to complete on time. At the end of March Project Management was still reviewing the draft, and developing comments for Ragnar Benson to answer with a revision of the draft schedule. In particular, Project Management has requested assurances that the work will be adequately staffed. At this time, the DOE milestones are not threatened. Using the currently approved Ragnar Benson schedule, Project Management estimated at the end of March that the negative float was 23 workdays; the new (as yet unaccepted) Ragnar Benson draft schedule forecasts completion on time. For the purposes of forecast this month Project Management suggests "splitting the difference" and estimates that DOE milestone L-2-18 (Target Service Building Shell complete) will be accomplished around July 7, and that the contract completion will not be worse than 10 days late.

As reported in February the drawings for a joint value engineering plan to use the water inflow for cooling were submitted to Ragnar Benson for pricing. The proposal was expected during

March, but Ragnar Benson was still discussing pricing issues with their subcontractors at the end of the month.

Work continued during March on an outside review of the design and materials for water discharge from the MINOS sump to provide "fresh eyes" to insure that a sufficiently high reliability to prevent flooding in the MINOS area is achieved.

The claims and contract closeout issues for the S. A. Healy contract are discussed at length in the procurement portion of this monthly report. The Disputes Resolution Board delivered no additional recommendations to the parties during March. No new Requests for Equitable Adjustments (REAs) were received in March. The claims management team is continuing to review previous REAs. At least one additional substantial REA is still anticipated, probably in late April or May.

Surface Buildings and Outfitting – E. McCluskey

At the Target Site, RBI excavated for the interior wall foundations and exit stairway from the Target Shaft. Sawcutting of the concrete shaft liner began where connections for passageways will be made.

Below-grade at Target, ironworkers installed angles for the life safety passageway roof support, followed by metal decking. Concrete was placed to finish the deck. LCW pipe installation continued in the Carrier Tunnel, and beam pipe was roughed-in and welded. Cable tray installation began at the upstream end of the Carrier Tunnel. Stairs were installed in the Extraction Enclosure to the Main Injector tunnel level. Conduit supports and installation continued in the Pre-target area. The Target Pit Liner concrete walls and walkways were completed. The piping and conduit rack for the 24" diameter penetration from the RAW room to the Target Hall was completed and put in place.

At the MINOS Site on the surface excavation continued for the utility corridor, with installation of water piping. RBI began foundation excavation. Sawcutting of the concrete shaft liner began where connections for passageways will be made. A stop activity order for excavation on the site was issued on March 7, 2003, as a result of an incident involving a nicked 480V conductor at this site. The site superintendent and an operator were removed from the project. More information regarding this may be found in the ES&H section of this report.

Below-grade at MINOS, ironworkers installed support angles for life safety passageway roofs. Electricians continued installation of utility supports in the Absorber Passageway. Electrical panels were installed upstream in this area, also cable tray on the utility supports throughout the Passageway. Pipefitters began installation of water piping in the Absorber Passageway and copper decay cooling piping in the Absorber Hall. RBI completed relocation of the existing temporary pumps to a location away from the bottom of the shaft, so as not to interfere with future work. Structural steel was delivered for the MINOS detector platform. Water treatment and monitoring continued.

The CMO staff and its consultant engineers reviewed shop drawing submittals and the updated schedule. Hanson Engineers met with CMO staff and NuMI project engineers to review

necessary electrical changes to the documents due to upsizing the Fermilab-provided transformer at the Target site. These changes will be issued with revised drawings.

Cost savings documents for Value Engineering ideas #2-4 were submitted by RBI.

RBI continued work on pricing for revision 6: reducing the pond water for cooling at MINOS, using the sump water in the tunnel for cooling, and discharging the sump water above grade to the Lab ICW system. Dialog between the construction manager and RBI management continued, to identify areas of pricing still requiring revision by the sub-tier contractors.

Change orders to the SBO subcontract were processed, mostly for field conditions changes, and Supplemental Agreement 4 was issued. The total cost changes to the project at the end of March were $424,382.38. No time has been added to the baseline SBO project schedule.

Hanson Engineers and Farnsworth Group continued work on the fault tree failure analysis of the MINOS pumping system and related electrical/controls systems. The draft analysis was presented by Hanson to the Lab this month. After reviewing the vulnerabilities, Hanson was directed to make revisions to the draft to understand the impact of changing some equipment and configuration to lessen the vulnerabilities. A final report is due in April.

MINOS DETECTORS (WBS 2.0) – R. Rameika

Overview

In March we continued to see good progress toward completion of the Far Detector. Except for a small amount of module production at the Caltech factory and testing of the final PMTs, almost all of the components needed to finish the detector are in hand at Soudan or will be arriving in time for the final plane installation, now anticipated for before the end of May.

Good progress continues on the Near Detector electronics production as well as the Near Detector rack preparation.

Some examples of statistics for the production status at the end of the month are given below. (Some production items that have been listed as 100% complete in prior months are not shown here.)

WBS	Far Detector Production Items	%Complete
2.1	Far detector steel planes for Super Module 2	90%
2.2	Far MUX boxes complete and delivered to Soudan	99%
2.2	Far detector module production	99%
2.2	Far detector modules delivered to Soudan	97%
2.4	Far detector planes installed at Soudan	91%

WBS	Near Detector Production Items	%Complete
2.2	Near MUX boxes complete and delivered to FNAL	31%

2.2	Near Readout Cables delivered to FNAL	17%
2.2	Near Light Injection Cables delivered to FNAL	100%
2.3	Near Electronics production MENU boards checked out	0%
2.5	Near Detector Planes installed	0%

Steel and Coils (WBS 2.1) - J. Kilmer, J. Nelson

The highlight of the month is the rolling of the last plates of MINOS steel. The final 100 plates were loaded on two rail cars and shipped on March 24th.

Cutting of steel plates for the far detector (FD) continued this month. A total of 20 planes of FD steel were cut at Olympic Steel and delivered to Soudan this month. This brings the total FD steel delivered to Soudan to 461 planes or 90% of the total for Supermodule 2.

The SM2 coil power supply was delivered to Soudan this month. It was moved underground and placed in location for hook up later this spring. All components of the SM2 coil conductor and cooling pipes were also brought underground from the surface storage facility in anticipation of installation this summer.

Scintillator Detector Fabrication (WBS 2.2) - D. Michael

Overview

Far detector production is now complete with just a few exceptions. The final Caltech scintillator modules and their shipment are scheduled for completion in April. The far detector PMT deliveries and PMT box production were scheduled to be finished in March but are slightly delayed, waiting for some replacement tubes from Hamamatsu. This delay has caused the final delivery of PMT boxes from Tufts to be delayed by about a month. We still hope to stay ahead of the installation demand, but there is some possibility that this might fall a few planes behind. Indiana went ahead and completed all PMT boxes and deliveries to Soudan. There is no expected cost impact from this one month delay in the final completion.

Production of PMT boxes, PMT testing and clear fiber cable production for the near detector continues with all aspects aiming for completion in the summer. Some of these completion dates are a month or two behind the nominal schedule but there is no impact on the near detector installation plan from these delays.

Photodetector Systems (WBS 2.2.4) - K. Lang

The Athens test stand has completed all the production PMT testing.

In Oxford the M64 PMT testing continued during March. Significant progress has been made. The current (approximate) statistics are:

PMTs

Received:	230 (100%)
Glued:	230 (100%)
Mounted:	205
Tested:	200
Accepted:	180
Failed:	11
Delivered:	172

The testing of PMT bases also continued.

In Austin, the M16 `T' test stand operated routinely with tubes which required re-checking of their previous characterizations. Two batches of tubes containing 37 (24+13) PMTs were shipped to Tufts. Tufts will need 12 more PMTs to complete all the MUX boxes. Some will come from the set of re-tested tubes. Replacement tubes from Hamamatsu are expected in mid-April.

MUX Boxes and Connectors (WBS 2.2.5) - S. Mufson

Connectors

Caltech and Indiana are providing the remainder of the connector finishing. 100% of the injection molded connectors were produced, 100% of the slots had been cut, and 95% of the hardware has been installed.

Far Detector MUX Box work at Indiana

100% of the MUX boxes (West+East+Shield+spares = 275) have been delivered to the Soudan mine from Indiana, and have been checked out to be ready for installation.

East Side Far Detector MUX Box work at Tufts – W. Oliver

At Tufts 100% (225/225) of the far detector MUX boxes have been completed without tubes. 98% (220/225) are completed, tested and have tubes installed, and have been delivered to the mine.

Near Detector MUX box work at RAL - T. Durkin

There are no more PMTs at the factory and none are expected until the end of the month. The CalDet shipment to go out in early April, as is the third FNAL shipment.

Calibration Systems (WBS 2.2.6) - P. Harris, J. Thomas

Light Injection Systems – P. Harris

To date, NDRO cables up to and including Number 323 (total 573) have passed transmission and light-leak testing. This latter figure includes the re-makes and re-tests that have been necessary. However the light-leak tester has a stripped thread in a connector, and there is thus a holdup on

that particular test at the moment while this is dealt with.
A small handful of 'special' light-injection cables (e.g. trigger PMT) is still outstanding. (Production at OMC has been disrupted by changes in personnel and by the annual stocktaking).

A potential new source of "linear" UV leds has been identified for the light-injection system. They are brighter than the originally-identified UV leds (although with a much larger spread in light output); they have the same mechanical mount (plastic lens) as the blue leds; they are a third of the cost of the other UV leds; and their spectrum peaks at a flatter part of the WLS absorption curve, as a consequence of which first tests suggest that they are even closer to linear than are the other UV leds. Tests continue.

Calibration Detector – J. Thomas

Work has continued on the analysis of the caldet data, in particular focus is on the calibration with muons. We are preparing the detector for the ND electronics, and have received the green cables from Indiana which have been prepared at two different lengths for ND running.

Factories (WBS 2.2.8) – J. Grudzinski

Factory 1 - Caltech

The Caltech Factory built 85 modules equivalent units in 21 working days giving a production at the goal rate of 4.0 modules per day. Total production to date is approximately 2022 modules. The factory continued with 9.3 full-time equivalent employees. The factory expects to complete production in April.

Electronics and Data Acquisition (WBS 2.3) – G. Pearce, P. Shanahan

Overview

The production of the Near Detector Front End electronics continues, with first articles of all printed circuit boards having been received. Each first article has been tested with in-house assembly, and production quantity fabrication has proceeded. Production assembly of all boards other than front end daughter cards (MENUs) will begin in April. First articles of MENU cards from the production assembly vendor have been received. Due to an internal miscommunication within the vendor, the first articles were not assembled using the process intended for production. This is being rectified by the assembly of a new set of first articles. This delay is not expected to impact the schedule for the CALDET run at CERN. The purchase orders for the Front End crates power supplies have been issued.

The source of the Ghost Trigger problem in the Far Detector Front End electronics appears to have been identified by the Harvard group. The problem only occurs when the VA chips are reset following the acquisition of extremely large pulses, well beyond the dynamic range specification for the detector. The problem was originally observed in extremely high intensity LED pulses used for detector calibration. The LED intensities have since been reduced to bring their signals within the dynamic range of the detector, and it is expected that data to be taken soon will show the problem to have been greatly reduced or eliminated. To prevent ghost

triggers from occurring following cosmic ray events with extremely large signals, an extra dead time will likely be imposed during the reset of the VA chips, on a front end board basis. The resulting decrease in live time will be very small.

Data from the Detector Control System (DCS) is now being stored automatically in a database. The High Voltage (HV) control system has undergone some major changes, including the incorporation of the use of a slow ramp-up of the voltages performed by the HV controller hardware. A retrofit to the Rack Protection System (RPS), which is needed to handle correctly failures of cooling fans, has been applied to 11 of 16 VME racks.

Steady progress continues on the Data Acquisition (DAQ) and Database systems.

Near Detector Front End Electronics (WBS 2.3.1) - G. Drake

Production of the electronics for the near detector continued. Assembly of the MENU Modules is in progress. All parts and boards have been delivered to the selected vendor. Job setup has been completed. There was a problem with the package size of one part, which has been corrected. First articles are due early April.

One of the first articles from printed circuit board fabrication for the MASTER was assembled at the end of February. In this period, the board was tested at Argonne. The board performed as expected with no problems found. Engineering approval was granted to proceed with the production fabrication. The fabrication was completed at the end of March, and we now have all boards and parts in hand. We have received quotes from three assembly vendors, and are in the process of setting up an assembly contract. We expect the assembly to begin in early April.

The first articles from printed circuit board fabrication for the MINDER, KEEPER, MINDER AUX, and KEEPER AUX have been received as well. One of each was assembled and tested at Argonne. All four boards performed as expected. Engineering approval was given to proceed with the production fabrication. The full quantities of all boards are expected by mid-April. We have received budgetary quotes for the assemblies. Work is in progress to award contracts. Assembly is expected to begin around the middle of April.

The redesign of the VTM was completed in February at IIT. A prototype has been fabricated. Assembly and testing is in progress.

The contract for the fabrication of the MINDER Crate was awarded to Schroff. We have received mechanical drawings for the crates, which have been approved. Printed circuit board layout drawings for the backplane are expected in early April. First articles are expected by mid-May.

The contract for the MINDER power supplies has been awarded to Wiener. First articles are expected by the end of April. Wiener was also awarded the contract for the MASTER power supplies. The full quantity of supplies is expected by early May.

Far Detector Front End Electronics (WBS 2.3.2) - R. Lee

Additional tests at Harvard have been performed to understand the nature and behavior of the ghost trigger problem. A large amount of charge equivalent to greater than 200 photoelectrons was injected into half of the channels of the VA chip corresponding to PMT anode outputs.

Without any charge being injected into the ASD-lite trigger chip, the amplified and shaped response of the ASD-lite showed a differentiated signal coincident in time with the VA charge injection. The shape of the signal is consistent with electronic crosstalk. Examination of the front end board schematics showed that the dynode traces which run from the muxbox connectors to the ASD-lite came within close proximity of the anode pads. The arrangement of the anode pads is such that only half of the pads corresponding to either even or odd VA channels can induce crosstalk in the ASD-lite. Crosstalk was observed when injecting charge into one set of even or odd channels, which is consistent with the board layout.

Although crosstalk into the trigger chip was observed, when a PMT outputs a pulse it normally outputs both anode and dynode pulses, and the crosstalk signal from the anode at the ASD-lite is completely masked by the dynode signal, and so has no effect. Because of the board layout, one VA chip's set of anodes can produce crosstalk on all three ASD-lite trigger inputs. However, the size of the pulse required to produce a dynode trigger is quite large, and in any case no anode pulses would be observed in the VA chips and would be consequently sparsified out of the data stream. The only effect is an extremely small and inconsequential increase in the dead time considering the lack of large signals.

The more important effect that was observed was that a large amount of charge being injected into the set of VA channels which produce crosstalk on the dynode lines would result in a second pulse at the time that the hold is released. This second pulse could result in another dynode trigger, depending on how much charge was being injected into the VA chip and the dynode trigger setting. When the VA chip was removed, this second pulse disappeared.

For this second pulse (which we will refer to as the ghost trigger) to be observable, so much charge has to be input into the VA chip that the VA preamplifiers become overdriven. The amount of charge required is above the specification laid out in the TDR (150 photoelectrons per channel, later raised to 200 photoelectrons). The reason for the ghost trigger is that when the hold is released, a switch is thrown inside the VA chip which brings the held voltages down. This action causes a disturbance on the overdriven preamplifiers inputs, and this disturbance is picked up as a signal on the ASD-lite input via electronic crosstalk.

The Harvard group has offered two solutions. The first is to do a complete redesign of the front end boards. Rough estimates indicate that this option would cost $200-$300k and approximately 1 year to implement. The second solution would be to update the firmware in the VARCs such that any triggers received in a time window around the release of the hold line of any VA chip are ignored. This would increase the dead time; for a 200 ns time window, the dead time would increase from roughly 5 microseconds to 5.6 microseconds, an increase of 10%. The Harvard group recommends the second option.

This understanding of ghost triggers in terms of overdriven VA preamplifiers and dynode crosstalk is inconsistent with ghost triggers extending out to many milliseconds after the initial

trigger. More data were taken with the light injection system at the far detector to study the time extent of the ghost trigger problem. It was found that no long term effects could be observed (long term meaning beyond 30 microseconds). Earlier plots suggesting a long time scale were not consistent with known PMT trigger rates, so it is possible that the long time scales seen in earlier plots were simply an artifact.

The Harvard group plans to implement and test the VARC firmware upgrade and then to deploy the upgrades on all VARCs at the far detector site at the end of April 2003.

Data Acquisition System (WBS 2.3.4) – G. Pearce

Work has continued this month supporting operations at Soudan and CERN. Software development on the DAQ and Online systems proceeds for both Near and Far systems. This month has seen steady, routine work with no significant events to report.

Database (WBS 2.3.5) - P. Border

During March 2003, the University of Minnesota Database Group continued to work on several fronts. We have acquired the near detector module data from our collaborators at Argonne and we will soon make it available to the collaboration at large. We continue to supervise the efforts of the Fermilab database group on our behalf. We continue to test the database data distribution system built by our collaborators at Oxford; this will become the default system very soon.

Detector Control and Monitoring (WBS 2.3.8) – A. Habig

1) Software. HV, Environmental, Magnet, and RPS data are now being logged to the DCS SQL database. Older data can be imported to this DB. A process exists which converts data to root objects as the data appears in the DB. A new linux machine is on the way from FNAL to be the "DCSDCP" machine. This machine will run the root file generation, DBU, and dispatcher processes that will get the DCS data out to the rest of the collaboration.

2) HV control. A number of changes are being made to the HV monitor/controller, including operational procedures. The change to a hardware rather than a software ramp means that the different ways one can turn on HV to the detector do different things.

3) Rack Monitoring. 11 of the 16 VME racks now have RPSs with all available refits applied. 4 of the 5 remaining RPSs are of an older "Rev.D" version on which the current "F2" refit does not work well. A workaround is on the way from BiRa which will allow us to finish the work. The top level FE rack smoke detection count remains at 4/16 complete.

4) Environmental Monitoring. The long-term drop in radon rates is being investigated. Does it come from air flow changes or a radon calibration issue? Data are being taken in the same location by the CDMS radon counter for comparison purposes, and the second MINOS radon counter is being repaired by the manufacturer.

Far Detector Installation (WBS 2.4) - J. Nelson

MINOS collaboration physicists and Soudan minecrew staff completed assembly of 27 additional detector planes, for a total of 445 planes installed at the end of March. This is an average installation rate of 6.4 planes per week worked. An additional 24 planes, for a total of 441 planes, were commissioned this month. The detector was routinely operated on evenings and weekends in March to record cosmic-ray muon and atmospheric neutrino data for calibration and performance studies.

Other activities continued on many fronts at Soudan in March. The DAQ group made successful upgrades to the run control server and LIMaster programs. The DCS group worked on upgrading five additional RPS units and on a series of upgrades to all DCS monitoring programs (except HV) to allow MySQL archiving of monitoring data. The HV code is still undergoing additional modifications to allow this archival with revised frequency. A number of special runs were taken to help diagnose the front-end electronics echo problem. The LI group completed tuning of pulser levels, diagnosed and fixed a small number of new cabling errors, and repaired four PIN diode channels that were not properly reading out. The SM2 coil power supply was delivered to Soudan this month. It was moved underground and placed in location for hookup later this spring. All components of the SM2 coil conductor and cooling system were also brought underground in anticipation of installation this summer.

As completion of the far detector approaches, the installation group and the various suppler tasks have updated their final production inventories and final delivery schedules for all remaining components needed for detector construction. In parallel the spare parts inventories and schedules were also reviewed.

Delivery close out review for detector construction have been successfully completed for:

WBS 2.1

Steel plates (all plate rolled, shipping schedule and inventory matches needs)
Steel system small parts (all parts delivered)
Coil systems (all components delivered)

WBS 2.2

Scintillator modules (all modules produced and match needs including spares; final shipments scheduled and matches needs; three shipments left)
Cables mounting hardware, shelves (inventory assessed and final parts in production)
The readout fiber cables (all parts delivered)
MUX boxes (all west boxes delivered, all spares delivered, final east box deliveries matches needs; one shipment left)
The LI system (all parts & spares delivered)

WBS 2.3

DAQ system (all parts delivered)
VARCs (all parts in hand)

VMMs (one part to be delivered from Caldet)
VFB (all boards delivered)
VAs (all parts needed for construction in hand)
RPSs (all parts in hand)
Cables (remaining control and power cables being fabricated and schedule meets construction needs)

The delivery and checkout of steel and scintillator continued throughout the month. This work is summarized below along with plane installation and commissioning statistics:

- Steel plates delivered to Soudan: for 20 detector planes (total of 461 planes or 95% of detector),
- Steel plates moved underground: for 19 detector planes (total of 453 planes or 93% of detector),
- Scintillator modules delivered to Soudan: for 13 detector planes (total of 471 planes or 97% of detector),
- Scintillator modules moved underground: for 21 detector planes (total 457 of planes or 94% of detector),
- Scintillator modules prepared for installation: for 29 detector planes (total of 454 planes or 93% of detector),
- Detector planes assembled and mounted: 27 detector planes (total of 445 planes or 91% of detector),
- Detector planes commissioned and reading out: 24 detector planes (total of 441 planes or 90% of detector).

There were no safety incidents at Soudan this month. March's Joint Soudan Laboratory Safety Meeting focused on an annual forklift refresher course.

Three new technicians were hired as temporary employees to replace previously departed installation workers for the remainder of the installation task. On average this month two physicist shift leaders and six collaboration physicists worked in the underground lab each day on installation-related tasks.

Near Detector Installation (WBS 2.5) - C. James, J. Thron

The second shipment of 30 PMTs in their 'Alner' boxes has arrived from England and the PMTs are being tested to see that they haven't changed since they left Rutherford. A shipment of optical fiber cables from Sussex and OMC has also arrived. At the South Carolina collaboration meeting arrangements were discussed with the British collaborators about people who could come to Fermilab to help with the Near Detector installation. They have identified a technician , two graduate students, and a physicist who will be able to spend extended periods helping with the work.

The Pittsburgh group has been sent the drawings for the fabrication and assembly of the fan packs for the MINDER racks. They feel that this is a task that will take them about 3 months to complete and they are preparing the MOU to get the necessary funds to pay for it.

The PMT to MINDER cables have been tested for flammability by the Fermilab PPD safety

people and were approved for our use in the enclosed MINDER racks. A sample of the MINDER to MASTER cable has also been submitted to them.

In the New Muon Lab, optical fiber cables have been removed from the old Four Plane Prototype and are being used on the cabling model at the plane storage rack to design and test the various fixtures needed to access the cable connections. A cabling connection exercise is planned for the third week of April. Work is continuing on the plumbing for the rack cooling; the prototype heater exchangers have been modified and are installed in racks.

Detector Alignment and Survey (WBS 2.4/2.5) - D. Boehnlein

We have now reached the point in detector installation where the planes are too far forward for the topmost module alignment holes and axial rod bolts to be measured with the Vulcan. The survey spreadsheet has been revised to estimate the positions of the upper alignment holes, using measurements of the bottom ones and some assumptions from the factory specifications. Alex Sousa has added refinements to it that include a quality assurance check and an estimate of the axial rod bolt positions. The minecrew surveyors have been trained in using the new spreadsheet.

We have posted NuMI Note 913, Module Surveys in Supermodule 1. This note describes the alignment of the modules relative to each other and to the u and v axes based on the Vulcan survey data.

MINOS Computing Efforts - J. Urheim

Overview

Reports from the computing hardware, offline software systems and reconstruction software groups are given in the sections below. The main activities during the past month were in the areas of database systems, reconstruction and calibration software, and detector simulation development. The MINOS batch processing group is also working to begin reprocessing of Far Detector data in April, using a new/recent version of the MINOS offline software. In March, limited use of the FNAL "fixed-target" batch processing farm was made to run jobs to compute timing calibration and alignment correction constants, as well as to catch up on processing of far detector data taken since January with the old version (release R0.8.0, ca. November 2002) of the offline software.

Computing Hardware - E. Buckley-Geer

We are setting up a new computer that will be sent to Soudan to be used for recording the DCS data. These data will be shipped back to Fermilab and stored in the tape robot. We upgraded the archiver software at Soudan to use new versions of the underlying packages in place of the very old ones currently in use. We also upgraded the archiver on the computer at CERN so that archiving of Caldet data can be restarted.

Offline Software Systems - G. Irwin

The Collaboration has entered Phase III of the transition from CVS distribution of offline database tables to the automated Data Base Maintenance (DBM) system of Nick West. As support for the CVS distribution system is being withdrawn, users are now obliged to convert to DBM distribution to keep up with calibration, connection map and geometry database updates.

Sue Kasahara converted Roy Lee's ntuple system to her standardized templated record format. This allows Roy's ntuple files to be read from the offline framework and synchronized with the RawRecord and CandRecord streams. We plan to output this new "CandNTupleSR" stream from the next wave of reconstruction production to begin during April.

There was progress in several areas of the developing C++ framework for Monte Carlo and Simulation. Contributors included Mark Messier, Brian Rebel, Mike Kordosky, Nathaniel Tagg, and Brett Viren.

Robert Hatcher continues to devote considerable effort to integrate evolving veto shield survey and connection data into the offline database. This is nearing completion for shield sections 1 and 2 (with help from Ben Speakman, Brian Rebel and Alex Sousa), but will have to be revisited once section 2 is reconfigured and sections 3 and 4 are added during the spring and summer months.

Diagnosis of crashes due to a ROOT bug introduced on February 24 has occupied significant amounts of time from Brett Viren and George Irwin during March. As the bug was detected before most MINOS collaborators had updated ROOT at their home sites, it did not seriously affect the work of users. The investigation brought the benefit of exposure to some valuable software diagnostic tools previously ignored by MINOS code developers. It also underlined the need to clean up some under-appreciated vulnerabilities of ROOT's CINT preprocessor. Finally, it gave us another reason to move ahead on a planned upgrade to Nick West's Navigation package, whose heavy use of CPP macros was what brought down CINT in this instance.

Reconstruction Software - J. Musser

During the month of March, substantial progress was made in the track reconstruction software, with a much more robust process for the removal of outlier hits. The ongoing problem with charge sign determination has also been fixed in the standard reconstruction package.

Also this month, the time calibration procedure has been tuned by Brian Rebel, using a more stringent set of requirements on the tracks used in the calibration procedure. With these changes in place, the velocity resolution is markedly improved. Brian also developed a framework for carrying out this calibration procedure, which is essentially completely 'hands off', with the new calibration constants going directly into the database with the proper validity context.

March 2003 MINOS Collaboration Meeting – D. Ayres

This meeting was held at the University of South Carolina in Columbia, South Carolina on Thursday through Sunday, March 6 to 9. Nearly eighty physicists, engineers and students from 24 institutions attended. The main meeting plenary sessions on Friday, Saturday and Sunday were preceded by working group meetings on Thursday. The following working groups and committees met on Thursday: CalDet results and planning issues, nu_mu CC event analysis, NC event analysis, offline software, outreach, and proton intensity.

The MINOS Executive Committee and Institutional Board both met in conjunction with this meeting. Policy issues discussed by both the ExCom and IB included: (a) the increasing need for Collaborator office space at Fermilab, (b) the expectation that each Ph.D. thesis student will devote a significant period of time to work of general utility to the MINOS experiment, either at Fermilab or Soudan, (c) the procedures for Collaboration approval of conference talks and papers containing the results of MINOS data analysis, and (d) the relationship of the MINOS Collaboration to the proposed off-axis experiment. The focus of Collaboration effort has already begun to shift to Fermilab as preparations for beamline and near detector installation get under way. A survey conducted by the Institutional Board before the meeting provided an estimate of Collaboration needs for office space at Fermilab during the next few years.

The most important topics discussed at this meeting were:

Physics analysis groups. Much of the plenary session time at this meeting was devoted to progress reports from the physics analysis working groups: (a) Atmospheric neutrinos, (b) nonoscillation physics with the far detector, (c) nu_mu CC events, (d) nu_e appearance, (e) NC events and NC/CC ratio, (f) near detector physics, and (g) beam systematics. Progress reports were also presented by the technical working groups that are providing critical tools for the analysis groups: (h) software, (i) calibration, and (j) reconstruction. The primary tasks of each analysis group are to define its physics goals, to set up a structure for accomplishing these goals, and to coordinate activities with other analysis and technical groups.

Development of a five-year MINOS run plan. Analysis group planning to accomplish long-term goals is complicated by the urgent short-term need to develop an overall neutrino beam running plan for the first five years of the experiment. The Collaboration plans to submit this plan to the Fermilab PAC in early June. In addition, the proton intensity needed to implement this plan will be provided to the new Fermilab committee, appointed by the Director and chaired by Dave Finley, that is developing a plan to satisfy the proton intensity needs of MINOS, MiniBooNE, and other users.

Physics papers and conference talks. The mechanisms set up some time ago for approving physics graphs (usually the results of simulations) need to be modified as conference talks begin to report on the analysis of actual data, where new data and improved analyses can change results on short time scales. The Collaboration plans to present preliminary results from the analysis of cosmic-ray muons in the far detector, to measure the mu+/mu- ratio, at conferences this summer. Atmospheric neutrino results may be ready to present at summer conferences in 2004. In addition, the first MINOS physics papers, on the mu+/mu- ratio and atmospheric neutrinos (upward going muons and contained events), will be written during the next 18

months. At this meeting the Collaboration began the process of modifying the approval process for conference talks and papers and determining the author list for the first physics papers.

Proton intensity issues. Since the December meeting the Collaboration has made some progress in its discussions with the Fermilab management towards general recognition of the need to provide additional resources for work to increase the proton intensity for MINOS. The establishment of the study group chaired by Dave Finley (described in item 2 above) is a very positive development in this regard. In addition, the number of MINOS postdocs and students working on Fermilab accelerator upgrades to increase proton intensity has grown since the last meeting. Collaboration physicists are now actively involved in studies of Booster RF system improvements, development of Booster extraction techniques for MINOS, and work on methods to stack beam in the Main Injector. University collaborators (from both MINOS and MiniBooNE) are also providing local machine shop facilities to manufacture components of the first large aperture Booster RF cavities in time for installation this summer.

Detector calibration. The CalDet group continues to make good progress in the analysis of data taken during the 2002 test beam run at CERN. Results were reported on proton and pion energy calibration, pion shower reconstruction, off-angle running, strip-to-strip response calibration, testing of UV LEDs in the light injection system, and the comparison of near and far detector electronics responses. The replacement of the original blue LEDs with UV LEDs in the light injection pulser boxes has apparently eliminated the nonlinearities observed earlier. In addition, the CalDet team is beginning to make detailed plans for the September 2003 run, which will be primarily devoted to near detector calibration.

Far detector operation. The completed sections of the MINOS far detector at Soudan continue to record data routinely, with both the magnetic field and the veto shield in operation for Supermodule 1. Upgrades to improve reliability and calibration accuracy are proceeding, although the detector already runs most of the time and the data appear to be of good quality. The installation of the far detector and of the veto shield over Supermodule 2 are both expected to be complete by the end of the summer and plans for routine operation in the post-construction period are now well advanced.

Relationship between MINOS Collaboration and off-axis experiment. The Collaboration agreed to continue its policy of keeping the MINOS and off-axis collaborations separate, at least until an off-axis experiment organization is better defined. However, potential off-axis collaborators can still join the MINOS Collaboration if they make substantial contributions to MINOS. Off-axis collaborators who want to work on proton intensity upgrades, which contribute to both experiments, are especially welcome.

Outreach activities. The Collaboration recognizes the importance of supporting outreach activities at Soudan, Fermilab and universities. Wider participation in these activities is necessary however. For the immediate future, Collaborators were urged to serve as tour guides at the annual Soudan Laboratory Open House on Saturday, May 3, and to develop displays and demonstrations for use at Soudan.

SOUDAN UNDERGROUND LABORATORY (WBS 3.3/3.4) - E. Peterson

Soudan Laboratory Construction and Outfitting (WBS 3.3)

Offical contract closing for Lakehead still awaits approval by University code officials of the final submissions of the fire protection drawings. Some omissions have been noted and the required documents have been submitted for final approval. April should see the contract with Lakehead closed, as well as the CNA engineering contract.

The excavation contract is closed.

Soudan Laboratory Operations (WBS 3.4)

Operation of the laboratory continues smoothly.

VI. ES&H HIGHLIGHTS – M. Andrews

Management Overview – M. Andrews

Mike Andrews continued to provide ES&H support to the Service Building & Outfitting Construction Management Offices (NCMO) to augment the civil construction oversight effort. His efforts include reviewing the implementation of the subcontractor's safety program, concurring with the subcontractor on where improvements are needed and the priority for those improvements, attending pre-shift subcontractor safety meetings to verify continuing improvement, and participating in weekly ES&H Inspections with the sub-contractor and representatives from the DOE Fermi Area Office.

The NuMI Project and Ragner Benson project management teams meet on a weekly basis to discuss work planning issues, hazard analysis review, training issues, general ES&H program issues, and day-to-day scheduling issues through a series of regularly scheduled meetings.

NuMI Beam Safety Issues – M. Andrews

An ESH/QA review spreadsheet, organized by WBS, is being developed to verify that proper reviews have been completed. A review of the spreadsheet for completeness was completed by Level 2 & 3 managers and comments were incorporated.

Three ESH/QA design reviews were initiated on beamline components during the month of March. The reviewed components included the NuMI Extraction Aisle Side Supports, the MI NuMI Stub Magnet Stands, and the NuMI Module Assembly Stand. Comments on the reviewed engineering notes were routed to the appropriate authors.

Construction Safety – M. Andrews

NuMI Project Management, FNAL ES&H Section, and DOE performed multiple ES&H reviews and audits during the month of March. NuMI Project Management developed and distributed a report for ES&H Inspections conducted on March 6th, 13th, 20th, and 27th, 2003. Safety

Findings/Deficiencies were transmitted to the Subcontractor through the NuMI Construction Management Office. A follow-up on each finding was conducted during the Weekly ES&H Inspections and in the Weekly Construction Management Meetings with Ragnar Benson Management in order to track and/or close each item.

RBI continues to hold their daily huddles, which include a review of task hazards, and their weekly toolbox meetings. RBI also held their monthly safety meeting, which addressed Hilti power actuated tools, with all employees at the construction site. NuMI Project personnel continue to monitor these meetings on a regular basis.

RBI continued in March 2003 to submit Hazard Analyses for review and acceptance to the SBO-CMO for all new tasks. The SBO-CMO has reviewed and accepted sixty Hazard Analyses to date.

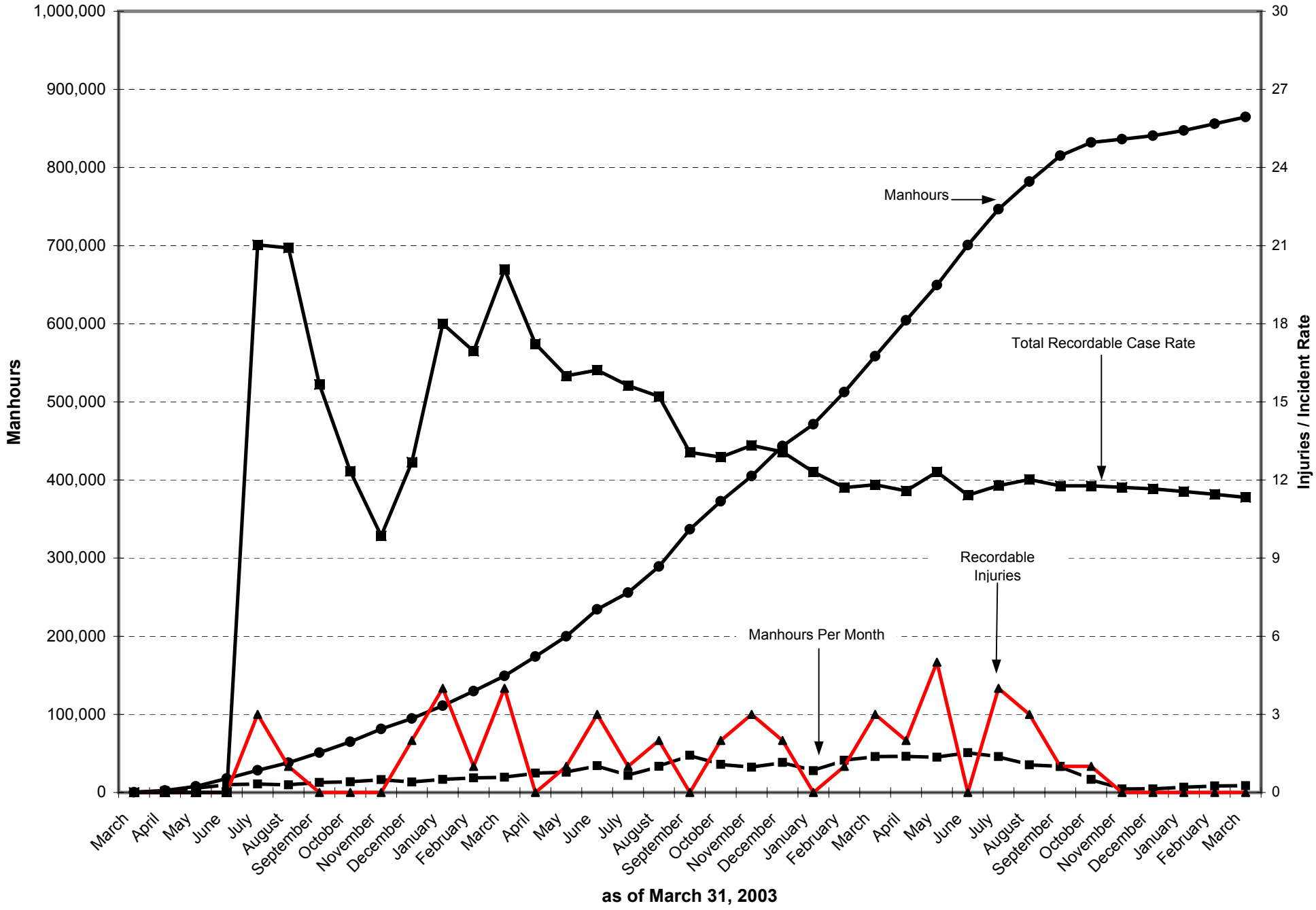
There were no OSHA-recordable injuries during the month of March 2003. During the month of March RBI and their subcontractors surpassed 121 consecutive days without an OSHA-recordable injury or illness. However, one non-injury incident did occur at the MINOS construction site during the month of March:

On March 6, 2003, a subcontractor excavation operator nicked an identified de-energized 480-volt AC (VAC) circuit insulation on Fermilab's MINOS site while digging the foundation for the MINOS Service Building (MSB). The damage to the insulation caused the electrical breaker that services the dewatering pumps at the base of the MINOS shaft to trip; however, the correct interpretation of the correlation between these two events was not immediately understood by the RBI management, due to the fact that the cable was still buried. As RBI laborers were hand digging to uncover the cable as part of a normal excavation task, they discovered the damage to the cable, which had been re-energized, releasing steam into the atmosphere. No one was injured and no property damage resulted.

The trenching activity was in support of the Service Building and Outfitting (SBO) phase of the NuMI construction project. Ragnar Benson, Inc (RBI) is the general subcontractor for this project. RBI investigated the incident in accordance with the requirements of their contract with Fermilab. The NuMI Project Construction Manager requested a formal investigation, in accordance with Chapter 3020 of the Fermilab ES&H Manual (FESHM). The investigation team, chaired by the NuMI Project ES&H Coordinator, reviewed documentation, including witness statements, and conducted interviews with RBI and subtier contractor employees involved with the incident. The RBI Site Superintendent and the Subtier Operator #1 had been removed from the site as part of the RBI response to the incident and were not available for interview. Therefore, some assumptions had to be drawn based upon third party statements. As part of the investigation, a root cause analysis was performed to identify the basic causes for which corrective actions could be fashioned to prevent recurrence of the incident.

Safety Performance for the NuMI Construction Project for 2003 Calendar Year to Date includes a Recordable Incident Rate of 0.0**,** a Lost Time Incident Rate of 0.0, and a Lost Workday Incident Rate of 0.0. The Project to Date Safety Performance includes a Recordable Incident Rate of 11.3, a Lost Time Incident Rate of 2.5, and a Lost Workday Incident Rate of 7.4. Figure 2 shows man-hours worked, and recordable injury and incident rates from the start of the NuMI construction subcontracts through March 2003.

Manhours, Recordable Injuries & Incident Rate from Start of Contract



Environmental Issues – M. Andrews

Discharge results to be reported to the IEPA for March are as follows:

MINOS Outfall 004
TSS Ave. 7 mg/l
pH 7.31

Target Outfall 006
TSS Ave. NA
pH NA

RBI continues to maintain the operation of the MINOS water treatment on a daily basis. RBI completed regular maintenance of the MINOS water treatment system during the month of March.

MINOS water treatment operated throughout the month without incident. Pond #2 was taken off-line and emptied in preparation for backfilling of excess soils after demolition and removal of shotcrete lining and water treatment process piping. The Stormwater Pond #3 volume was monitored throughout the month and emptied as needed to maintain allowable stormwater storage.

Ongoing erosion control findings: RBI completed findings throughout the month

MINOS Safety Issues – D. Boehnlein, J. Nelson

There were no safety incidents at Soudan this month. The monthly MINOS Joint Safety Meeting at Soudan included forklift safety refresher training for the minecrew. A work platform has been constructed on top of the 50-ton crane and has passed an internal safety review.

Radiation Safety Issues – N. Grossman

The final comments from the ES&H Section on our groundwater activation methodology document were incorporated into the document. This document is now ready for final sign-off. The air activation methodology document is nearly ready for sign-off, and a draft of the residual dose rate methodology document for NuMI is nearly complete. BD ES&H Dept. and the Fermilab ES&H Section agreed that the project schedule for completing the Shielding Assessment and the Safety Assessment Document (SAD) was reasonable. A first rough draft of the NuMI SAD was completed. The document that estimates the dose rates beyond the carrier tunnel after the 30 foot wall in the Main Injector was signed off by the Project and the ES&H Section.

VII. LEVEL 3 MILESTONES

The current NuMI/MINOS Level 3 Milestones are shown in Figure 3.

Only milestones for the period 1/03 to 12/03 are shown. The triangles are the fixed Fermilab milestones. Note that we show L3 milestones along with the new "L-3-n" identifiers.

Actual dates of achieving milestones are shown as black diamonds. Currently projected dates for achieving milestones are shown as hollow diamonds. Projected milestone dates which differ from the fixed Fermilab milestone dates by more than two weeks are flagged as **<Late>** or **<Early>**.

VIII. VARIANCE ANALYSIS – G. Bock

Variances are reported in the cost and schedule reports against the NuMI Project's plan, which is considerably more aggressive than that required by the DOE milestones. In all cases the project remains comfortably ahead of schedule with respect to the DOE milestones and within baseline cost.

We include the Variance Summary Table. Cost and schedule variances against the project's plan are extracted from the Cost Tables in Section IX and shown here at Level 2.

DOE MILESTONES

No DOE Milestones were due or completed during March. As mentioned earlier in this report a schedule variance does appear in the SB&O work with respect to the current approved schedule. The contractor has submitted a revised schedule that shows project completion on schedule. Project management elects to project completion of Milestone L-2-11 10 days later than the contract date. This is what we had reported last month. Milestone forecast dates for all remaining DOE milestones continue to include comfortable amounts of float.

NuMI (WBS 1.1)

The Technical Components unfavorable cost variance for this month is reported to be $466K, reduced from last month by removal of some costs for spares that had been carried on the project. Approximately $80K of that variance is not real and will be removed next month. The remaining cost variances are still dominated by WBS 1.1.2 and WBS 1.1.3 due to labor overruns on horn and joint fabrication and kicker power supply design/drafting. A favorable schedule variance of about $1,000K indicates the project is somewhat ahead of schedule. In fact that variance somewhat underreports the actual favorable situation.

NuMI (WBS 1.2)

Schedule variance: As discussed earlier in this report project management forecasts a schedule variance of approximately 2 weeks in the Service Buildings and Outfitting contract work. The contractor agrees with this assessment but has provided a new revised schedule that shows project completion on the contract date. The unfavorable variance with respect to the original schedule is reported in the Variance Summary Table, ($1,802K). It corresponds to a 23 day delay discussed earlier in this report. Project management is watching this carefully.

Cost variance: There is no significant cost variance in WBS 1.2. A negative variance arising principally from an accrual against potential future claim settlements from work on the Tunnels and Halls project is counterbalanced now by a positive variance on Title III. Costs for the Service Buildings and Outfitting contract remain comfortably on the plan.

NuMI (WBS 1.3)

Cost variance: There is an apparent favorable variance in WBS 1.3 which results from some incorrect schedule assumptions that will be corrected in a future CR. Some, but not all, of this positive variance may be real.

MINOS (WBS 2)

Cost and Schedule variances: The large favorable cost variances shown for the MINOS Detector are not real. Work over the next few months closing out the detector construction contracts will show these variances disappearing with final invoicing from other institutions. Careful attention continues to be paid to the situation each month. The small schedule variances shown in WBS 2 will not affect the detector completion. There are no real, net cost or schedule variances in WBS 2.0.

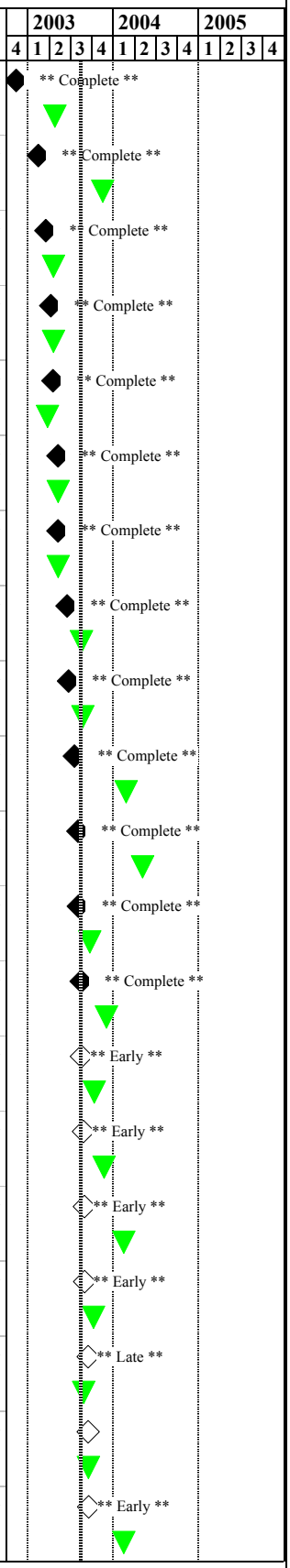
MINOS Cavern and Project Support (WBS 3)

The MINOS Cavern outfitting is complete. Final cavern construction costs (WBS 3.3) are reflected in this report, clearly a false positive variance. An artificial favorable cost variance shown for WBS 3.4 results from delays in invoicing. There are no significant variances in WBS 3.

NuMI WBS Level 3 Milestones
(1 Year Window 1/2003 - 12/2003)

5/13/03

Mlstn#	WBS Lev 3	Name	FNAL Current Forecast	FNAL Baseline Date	Float
L-3-118	114	Finish ASME Vacuum Vessel Shell Calculations/FESHM Note	6/26/02	12/9/02	0 d
L-3-135	111	Operational Beam Permit Prototype	9/30/02	7/2/03	0 d
L-3-137	120	T&H NCMO Estimate BO of Healy Upstream Area	11/1/02	12/4/02	0 d
L-3-138	120	T&H NCMO Estimate BO of Healy Downstream Area	11/22/02	12/4/02	0 d
L-3-139	113	Start Testing of Prototype Horn 1 Flex Joint at MI-8	12/2/02	11/8/02	0 d
L-3-150	112	Sub Bid Pkge for Target Module Main Frame	12/23/02	12/23/02	0 d
L-3-151	112	Sub Bid Pkge for Horn2 Module Main Frame	12/23/02	12/23/02	0 d
L-3-154	111	BPM Electronics Technology Selection	1/31/03	4/1/03	0 d
L-3-152	112	Horn 1 Inner Conductor Welding Compl	2/5/03	4/7/03	0 d
L-3-155	118	L3 Managers Review of Controls Syst Design Compl	3/3/03	10/10/03	0 d
L-3-196	112	Production Target Fabrication Complete	3/17/03	12/19/03	0 d
L-3-157	111	Kicker Magnet & Cooling Syst Design & Dwgs Compl	3/20/03	5/8/03	0 d
L-3-172	113	Kicker Power Supply Design & Dwgs Compl	3/31/03	7/17/03	0 d
L-3-158	112	Lower Chase Shielding Fab & Installation Dwg Set Compl	4/1/03	5/26/03	61 d
L-3-179	120	Pit Liner Complete	4/10/03	7/7/03	82 d
L-3-153	117	RAW Systems Engineering Notes Sent for Review	4/15/03	9/30/03	348.5 d
L-3-177	120	Service Bldg Foundations Complete	4/16/03	5/23/03	50 d
L-3-159	111	Stub Major Magnet Stands Design & Drawings Compl	4/30/03	4/11/03	3 d
L-3-156	112	Production Horn 2 Assembly Complete	4/30/03	5/1/03	85 d
L-3-171	112	Upper Chase Shielding Fab & Installation Dwg Set Compl	5/2/03	9/29/03	315 d

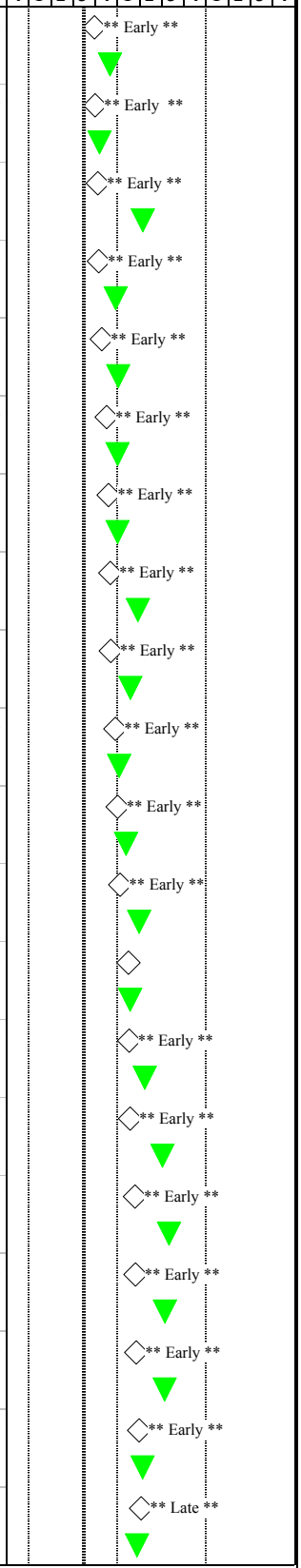


FNAL Current Forecast ◇ FNAL Baseline Date ▼ Milestone Complete ◆

NuMI WBS Level 3 Milestones
(1 Year Window 1/2003 - 12/2003)

5/13/03

Mlstn#	WBS Lev 3	Name	FNAL Current Forecast	FNAL Baseline Date	Float
L-3-173	114	Purch Order for Core Modules, Aluminum Submitted	5/12/03	7/15/03	198.5 d
L-3-175	118	Sub Req for Shaft Cables for SB&O Installation	5/15/03	6/2/03	36 d
L-3-178	114	Core Backshielding Steel Fabricated	5/27/03	11/28/03	384.5 d
L-3-174	112	Production Horn 1 Assembly Complete	5/30/03	8/7/03	127 d
L-3-176	118	Cable System Specifications Complete	6/11/03	8/18/03	127 d
L-3-170	113	Transmission Line Design & Dwgs Compl	7/1/03	8/15/03	230 d
L-3-191	120	Target Service Bldg Shell Complete	7/9/03	8/15/03	22 d
L-3-192	117	U.S. LCW Syst Piping & Equip Installed in MI-62	7/16/03	11/7/03	242 d
L-3-194	112	Assembly of Horn 1 Module Complete	7/18/03	10/7/03	212 d
L-3-190	112	Complete Horn 2 Operational Testing in Test Stand	8/6/03	8/22/03	80 d
L-3-193	120	MSB Shell Complete	8/15/03	9/19/03	-13 d
L-3-195	113	Kicker Power Supply Construction Complete	8/26/03	11/12/03	160 d
L-3-198	120	Beneficial Occupancy of UG Target Area	9/30/03	10/6/03	17 d
L-3-197	112	Complete Horn 1 Operational Testing in Test Stand	10/2/03	12/5/03	176 d
L-3-199	113	Compl Install of Horn Power Supply in PS Room	10/6/03	2/16/04	284 d
L-3-210	114	Start of U.S. Vacuum Endcap Installation	10/27/03	3/15/04	305 d
L-3-216	112	Assembly of Horn 2 Module Complete	10/28/03	2/26/04	170 d
L-3-235	112	Assy of Target/Baffle Module Complete	10/31/03	2/25/04	165 d
L-3-211	120	MINOS Service Bldg Complete	11/12/03	11/26/03	131 d
L-3-237	111	Pre-Target Equip Stands Ready for Installation	11/20/03	11/3/03	39 d



FNAL Current Forecast ◇ FNAL Baseline Date ▼ Milestone Complete ◆

NuMI WBS Level 3 Milestones
(1 Year Window 1/2003 - 12/2003)

5/13/03

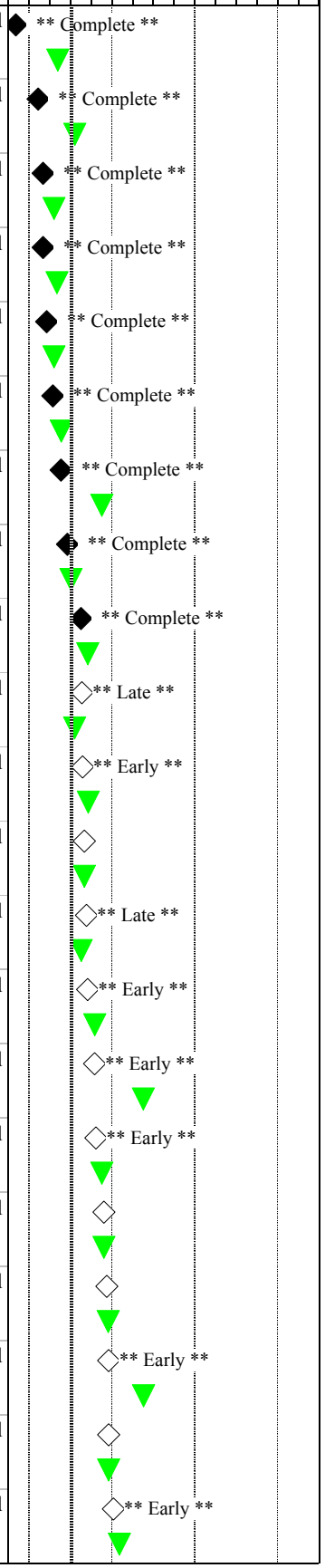
Mlstn#	WBS Lev 3	Name	FNAL Current Forecast	FNAL Baseline Date	Float	2003 4	2003 1	2003 2	2003 3	2003 4	2004 1	2004 2	2004 3	2004 4	2005 1	2005 2	2005 3	2005 4
L-3-213	115	Muon Monitors Ready for Installation	11/20/03	3/19/04	248 d						◇ ** Early ** ▼							

FNAL Current Forecast ◇ FNAL Baseline Date ▼ Milestone Complete ◆

MINOS WBS Level 3 Milestones
(1 Year Window 1/2003 - 12/2003)

5/13/03

Mlstn #	WBS Lev 3	Name	FNAL Current Forecast	FNAL Baseline Date	Float
L-3-225	211	First SM2 Steel Delivered	6/17/02	12/18/02	0d
L-3-247	214	Near Magnet Coil Delivery	9/23/02	3/3/03	0d
L-3-249	224	Spare PMTs Delivered	10/15/02	12/2/02	0d
L-3-260	226	Second Test Beam Running Complete	10/15/02	12/15/02	0d
L-3-262	221	100% of Scintillator Produced	10/31/02	12/2/02	0d
L-3-265	228	100% of Near Modules Complete	11/27/02	1/3/03	0d
L-3-266	225	50% of Near MUX Boxes Complete	1/2/03	6/30/03	0d
L-3-267	245	150 SM2 Planes Complete	1/30/03	2/14/03	0d
L-3-281	222	50% of ND Clear Cables Complete	3/31/03	4/29/03	0d
L-3-269	228	100% of Far Modules Complete (100% of SM2)	4/4/03	3/3/03	227d
L-3-280	245	200 SM2 Planes Complete	4/7/03	5/1/03	224d
L-3-282	231	Begin MENU Card Checkout	4/15/03	4/15/03	113d
L-3-268	225	100% of Far MUX Boxes Complete (100% of SM2)	4/24/03	3/31/03	193d
L-3-283	211	Final Steel Delivery to Soudan	4/28/03	5/30/03	190d
L-3-285	225	100% of Near MUX Boxes Complete	5/30/03	12/30/03	186d
L-3-284	245	All SM2 Planes Installed	6/4/03	6/30/03	224d
L-3-287	231	Complete Shipping for CalDet	7/10/03	7/10/03	29d
L-3-286	253	Complete Cable/Rack Mock-up	7/22/03	7/28/03	149d
L-3-288	222	100% of ND Clear Cables Complete	7/31/03	12/31/03	143d
L-3-289	251	50% of ND Rack Assy Complete	7/31/03	7/31/03	143d
L-3-300	245	Approve SM2 Coil Turnon - UMN/DNR/FNAL	8/20/03	9/15/03	170d



FNAL Current Forecast ◇ FNAL Baseline Date ▼ Milestone Complete ◆

MINOS WBS Level 3 Milestones
(1 Year Window 1/2003 - 12/2003)

Mlstn #	WBS Lev 3	Name	FNAL Current Forecast	FNAL Baseline Date	Float	2003 4	2003 1	2003 2	2003 3	2003 4	2004 1	2004 2	2004 3	2004 4	2005 1	2005 2	2005 3	2005 4	20 1	20 2
L-3-303	251	100% of ND Rack Assy Complete	12/1/03	10/29/03	58d						◇** Late ** ▼									

FNAL Current Forecast ◇ FNAL Baseline Date ▼ Milestone Complete ◆

Variance Summary Table

(Cumulative to Date as of 3/31/03)

WBS / Description	Budgeted Cost		Actual Cost	Variance	
	Work Scheduled	Work Performed	Work Performed	Schedule	Cost
1.1 Technical Components	13,538	14,619	15,086	1,081	(466)
1.2 Facility Construction	58,018	56,216	56,207	(1,802)	9
1.3 Project Management	3,119	3,119	2,402	0	717
1.0 TEC Total	**74,676**	**73,955**	**73,695**	**(721)**	**260**
2.1 Magnets: Steel & Coils	7,051	7,433	7,413	382	19
2.2 Scintillator Detector Fabrication	19,522	19,481	19,224	(41)	256
2.3 Electronics, DAQ & Database	8,603	8,398	7,318	(205)	1,080
2.4 Far Detector Installation	4,832	4,624	3,632	(208)	993
2.5 Near Detector Installation	1,205	1,060	1,015	(146)	45
2.6 MINOS Project Management	1,415	1,415	1,469	0	(54)
UK In-Kind Contribution	(4,767)	(4,734)	(4,734)	33	0
2.0 MINOS Detector	**37,861**	**37,677**	**35,337**	**(185)**	**2,339**
3.1. NuMI Conceptual Design	1,933	1,933	1,928	0	5
3.2 MINOS Detector R&D	1,780	1,780	1,768	(0)	12
3.3 MINOS Cavern	14,527	14,527	14,527	0	0
3.4 Soudan/MINOS Operating	1,765	1,766	1,452	1	313
Minnesota Preconstruction Funds	(758)	(758)	(758)	0	0
Minnesota Contruction Funds FY99	(3,000)	(3,000)	(3,000)	0	0
3.0 NuMI Project Support	**16,246**	**16,247**	**15,917**	**1**	**330**
OPC Total	**54,108**	**53,924**	**51,254**	**(184)**	**2,669**
TPC Total	**128,784**	**127,879**	**124,949**	**(905)**	**2,929**

IX. COST REPORTS

Cost and earned value reports for the NuMI Project are presented in two sets, one for WBS 1.0 Total Estimated Cost (TEC), and a second for Other Project Costs (OPC) that includes both the MINOS Detector (WBS 2.0) and Project Support (WBS 3.0). Information for all segments of the project is summarized at WBS Level 3 except in the case of the OPC CURVE Reports that are at WBS Level 2 instead. The actual cost of work performed (ACWP) is comprised of the following: 1) costs collected and reported by the Fermilab financial system, 2) costs collected and reported to NuMI Project Management by the University of Minnesota in their monthly progress report for WBS 3.3 MINOS Cavern, and 3) an estimate of the value of work performed by the United Kingdom (UK) collaborating institutions towards their in-kind contribution. Since the UK collaborating institutions are not required to report their actual costs to NuMI Project Management, we are assuming that actual current period costs and cumulative costs are equal to current period earned value and cumulative earned value, respectively. Each set of cost and earned value reports includes the following:

CPR Format 1A
This is a modified version of the traditional CPR Format 1 report that shows indirect cost for each WBS Level 3 rather than as a single line item for the entire project. As a result it is possible to review the status of both burdened and unburdened costs for each major system or cost component. In addition, the report for the OPC includes a summary section at the end, with WBS Level 2 totals for the MINOS Detector and Project Support segments of the project.

CPR Format 3
This is the traditional format for reporting changes to the project baseline that were approved and implemented in the current reporting period, as well as their impact on the time phased project baseline.

CURVE Reports
These graphically depict cumulative Budgeted Cost of Work Scheduled (BCWS), Budgeted Cost of Work Performed (BCWP), and Actual Cost of Work Performed (ACWP), at WBS Level 3 and WBS Level 2 for the TEC and OPC, respectively. The OPC reports reflect all project costs, including the UK In-Kind Contribution, and also funding contributed ($3.758M) by the University of Minnesota. All amounts shown are fully burdened.

Plan v Act Reports
These reports compare burdened planned costs (BCWS) with burdened actual costs (ACWP) on a cumulative basis through the end of the prior fiscal year, and by month for the current fiscal year. There are two versions of this report, one for total cost, and a second for labor costs only. Both OPC versions exclude the value of UK In-Kind Contributions and thus represent US Funds only.

NuMI Project Obligations
This report reflects burdened obligations to date, including requisitions in progress, for the entire project, as recorded in the Fermilab financial system. Consequently, it does not include any assumed obligations with respect to work performed by the UK collaborating institutions. Nor does it reflect actual amounts obligated by the University of Minnesota under the grant for WBS 3.3 MINOS Cavern; instead, obligations shown for WBS 3.3 represent the cumulative amount of the Financial Plan transfers to the University of Minnesota from the Fermilab budget.

NuMI Project TEC

($000's Omitted)

Cost Performance Report - Work Breakdown Structure

Contractor:	Fermi National Accelerator Laboratory	Contract Type/No:		Project Name/No:	Report Period:
Location:	Batavia			NuMI TEC	2/28/03 3/31/03

Quantity	Negotiated Cost	Est. Cost Authorized Unpriced Work	Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling
1	109,242	0	0	0	109,242	0		0	0

WBS[2] / WBS[3] / Results...	Current Period					Cumulative to Date					At Completion		
	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance				
Item	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Budgeted	Latest Revised Estimate	Variance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1.1 Technical Components													
1.1.1 Extraction & Primary Beam													
Direct Cost + Escalation	230	101	122	(129)	(21)	1,875	2,085	2,097	210	(12)	3,817	3,817	0
Indirect Cost	44	21	35	(23)	(14)	457	485	527	27	(42)	869	869	0
WBS[3]Totals:	274	123	158	(151)	(35)	2,333	2,570	2,624	237	(55)	4,687	4,687	0
1.1.2 Neutrino Beam Devices													
Direct Cost + Escalation	(237)	(240)	(417)	(3)	178	4,689	4,963	5,125	274	(162)	7,969	7,969	0
Indirect Cost	(10)	(10)	(30)	(0)	20	1,140	1,198	1,170	58	28	1,843	1,843	0
WBS[3]Totals:	(247)	(250)	(447)	(3)	197	5,829	6,161	6,295	332	(134)	9,813	9,813	0
1.1.3 Power Supply System													
Direct Cost + Escalation	205	86	81	(119)	5	2,656	2,674	2,873	18	(199)	3,644	3,644	0
Indirect Cost	49	27	20	(22)	6	644	658	694	14	(37)	857	857	0
WBS[3]Totals:	254	113	102	(142)	11	3,300	3,332	3,568	32	(236)	4,500	4,500	0
1.1.4 Hadron Decay and Absorber													
Direct Cost + Escalation	15	15	38	0	(23)	365	374	464	9	(90)	1,182	1,182	0
Indirect Cost	3	3	7	(0)	(5)	107	108	120	1	(11)	263	263	0
WBS[3]Totals:	18	18	45	(0)	(28)	472	482	584	10	(102)	1,445	1,445	0
1.1.5 Neutrino Beam Monitoring													
Direct Cost + Escalation	10	8	17	(2)	(9)	194	271	121	77	150	455	455	0
Indirect Cost	0	0	0	(0)	0	22	23	25	1	(2)	26	26	0
WBS[3]Totals:	10	8	17	(2)	(9)	216	294	146	78	148	481	481	0
1.1.6 Alignment Systems													
Direct Cost + Escalation	2	1	0	(0)	1	190	193	145	4	48	240	240	0
Indirect Cost	0	0	(0)	(0)	0	54	56	37	2	18	68	68	0
WBS[3]Totals:	2	2	(0)	(0)	2	244	249	183	5	66	308	308	0
1.1.7 Water, Vacuum & Gas Systems													
Direct Cost + Escalation	31	70	65	39	5	379	670	702	291	(32)	1,778	1,778	0
Indirect Cost	10	13	15	3	(1)	100	158	156	58	2	407	407	0
WBS[3]Totals:	41	84	80	43	4	479	828	857	349	(29)	2,185	2,185	0
1.1.8 Installation and Integration													
Direct Cost + Escalation	52	0	10	(52)	(10)	471	504	635	33	(131)	2,240	2,240	0
Indirect Cost	10	0	3	(10)	(3)	133	138	130	4	8	498	498	0
WBS[3]Totals:	62	0	13	(62)	(13)	604	641	765	37	(124)	2,738	2,738	0
1.1.9 Hadronic Hose (Close-out)													
Direct Cost + Escalation	0	0	0	0	0	53	53	54	0	(0)	53	53	0
Indirect Cost	0	0	0	0	0	9	9	9	0	(0)	9	9	0
WBS[3]Totals:	0	0	0	0	0	62	62	63	0	(1)	62	62	0

NuMI Project TEC

($000's Omitted)

Cost Performance Report - Work Breakdown Structure

Contractor:	Fermi National Accelerator Laboratory		Contract Type/No:		Project Name/No:	Report Period:	
Location:	Batavia				NuMI TEC	2/28/03	3/31/03

Quantity	Negotiated Cost	Est. Cost Authorized Unpriced Work	Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling
1	109,242	0	0	0	109,242	0		0	0

WBS[2] / WBS[3] / Results...	Current Period					Cumulative to Date					At Completion		
	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance				
Item	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Budgeted	Latest Revised Estimate	Variance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
WBS[2]Totals:	414	97	(32)	(317)	129	13,538	14,619	15,086	1,081	(466)	26,219	26,219	0
1.2 Facility Construction													
1.2.1 Facility Physics Design Phase													
Direct Cost + Escalation	0	0	0	0	0	49	49	52	0	(3)	49	49	0
Indirect Cost	0	0	0	0	0	21	21	19	0	2	21	21	0
WBS[3]Totals:	0	0	0	0	0	70	70	70	0	(0)	70	70	0
1.2.2 Facility Construction Title I Design Phase													
Direct Cost + Escalation	0	0	0	0	0	1,254	1,254	1,288	0	(34)	1,254	1,254	0
Indirect Cost	0	0	0	0	0	184	184	149	0	35	184	184	0
WBS[3]Totals:	0	0	0	0	0	1,438	1,438	1,437	0	1	1,438	1,438	0
1.2.3 Facility Construction Title II Design Phase													
Direct Cost + Escalation	0	0	0	0	0	2,620	2,620	2,807	0	(187)	2,620	2,620	0
Indirect Cost	0	0	0	0	0	355	355	167	0	188	355	355	0
WBS[3]Totals:	0	0	0	0	0	2,975	2,975	2,974	0	1	2,975	2,975	0
1.2.4 Facility Construction Phase													
Direct Cost + Escalation	2,167	981	1,009	(1,185)	(28)	52,167	50,367	50,577	(1,801)	(211)	60,979	60,979	0
Indirect Cost	26	29	36	3	(7)	1,367	1,366	1,148	(1)	218	1,596	1,596	0
WBS[3]Totals:	2,192	1,010	1,045	(1,182)	(35)	53,535	51,733	51,725	(1,802)	7	62,576	62,576	0
WBS[2]Totals:	2,192	1,010	1,045	(1,182)	(35)	58,018	56,216	56,207	(1,802)	9	67,059	67,059	0
1.3 Project Management													
1.3.1 FY 98 Project Management													
Direct Cost + Escalation	0	0	0	0	0	208	208	104	0	104	208	208	0
Indirect Cost	0	0	0	0	0	66	66	37	0	29	66	66	0
WBS[3]Totals:	0	0	0	0	0	275	275	141	0	133	275	275	0
1.3.2 FY 99 Project Management													
Direct Cost + Escalation	0	0	0	0	0	425	425	512	0	(88)	425	425	0
Indirect Cost	0	0	0	0	0	135	135	149	0	(14)	135	135	0
WBS[3]Totals:	0	0	0	0	0	560	560	661	0	(102)	560	560	0
1.3.3 FY 00 Project Management													
Direct Cost + Escalation	0	0	0	0	0	436	436	521	0	(85)	436	436	0
Indirect Cost	0	0	0	0	0	139	139	142	0	(3)	139	139	0
WBS[3]Totals:	0	0	0	0	0	575	575	663	0	(88)	575	575	0
1.3.4 FY 01 Project Management													
Direct Cost + Escalation	0	0	0	0	0	522	522	331	0	191	522	522	0
Indirect Cost	0	0	0	0	0	166	166	92	0	74	166	166	0
WBS[3]Totals:	0	0	0	0	0	688	688	423	0	265	688	688	0

NuMI Project TEC

($000's Omitted)

Cost Performance Report - Work Breakdown Structure

Contractor:	Fermi National Accelerator Laboratory			Contract Type/No:			Project Name/No:		Report Period:	
Location:	Batavia						NuMI TEC		2/28/03	3/31/03
Quantity	Negotiated Cost		Est. Cost Authorized Unpriced Work	Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling
1	109,242		0	0	0	109,242	0		0	0

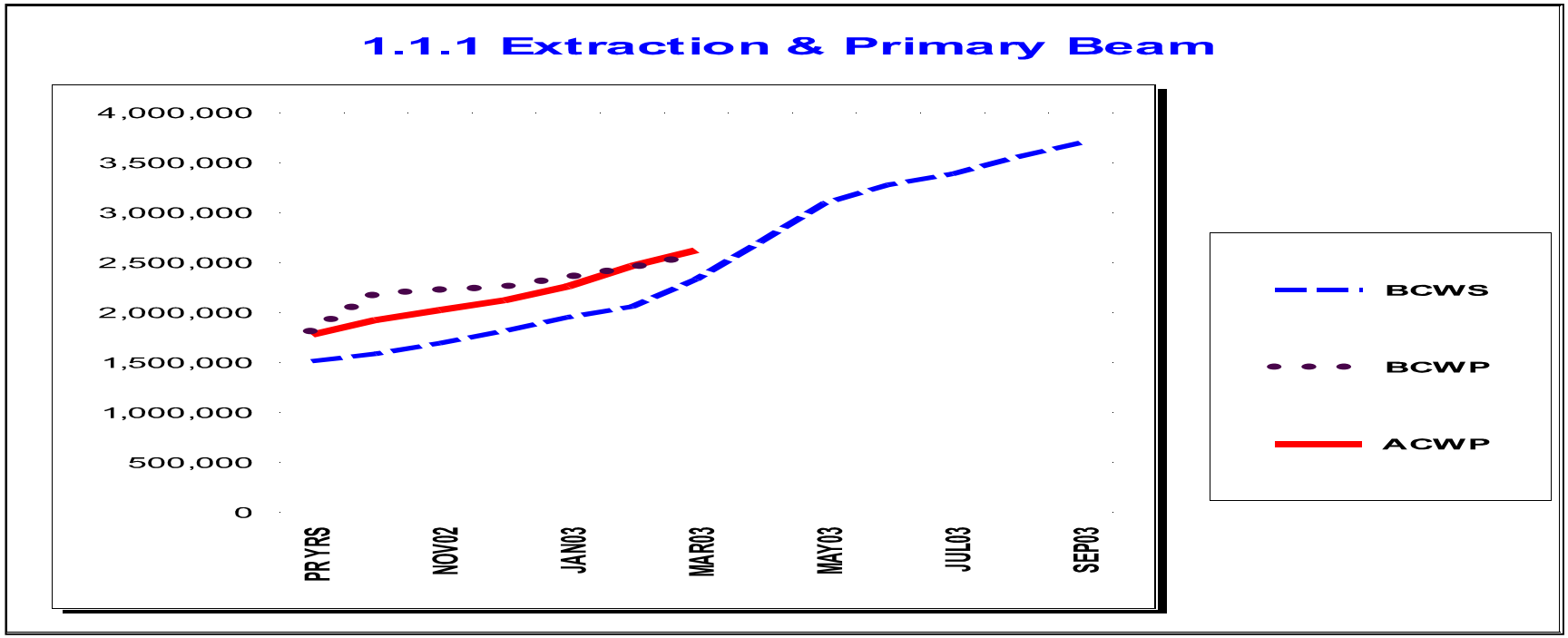
WBS[2] WBS[3] Results...	Current Period					Cumulative to Date					At Completion		
	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance				
Item	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Budgeted	Latest Revised Estimate	Variance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1.3.5 FY 02 Project Management													
Direct Cost + Escalation	0	0	0	0	0	533	533	253	0	281	533	533	0
Indirect Cost	0	0	0	0	0	170	170	72	0	98	170	170	0
WBS[3]Totals:	0	0	0	0	0	703	703	324	0	378	703	703	0
1.3.6 FY 03 Project Management													
Direct Cost + Escalation	39	39	31	0	8	242	242	145	0	97	486	486	0
Indirect Cost	12	12	9	0	3	77	77	44	0	33	155	155	0
WBS[3]Totals:	52	52	41	0	11	319	319	190	0	130	641	641	0
1.3.7 FY 04 Project Management													
Direct Cost + Escalation	0	0	0	0	0	0	0	0	0	0	499	499	0
Indirect Cost	0	0	0	0	0	0	0	0	0	0	159	159	0
WBS[3]Totals:	0	0	0	0	0	0	0	0	0	0	658	658	0
1.3.8 FY 05 Project Management													
Direct Cost + Escalation	0	0	0	0	0	0	0	0	0	0	251	251	0
Indirect Cost	0	0	0	0	0	0	0	0	0	0	80	80	0
WBS[3]Totals:	0	0	0	0	0	0	0	0	0	0	330	330	0
WBS[2]Totals:	52	52	41	0	11	3,119	3,119	2,402	0	717	4,430	4,430	0
General and Administrative	0	0	0	0	0	0	0	0	0	0	0	0	0
Undistributed Budget											0	0	0
Sub Total	2,658	1,159	1,053	(1,499)	105	74,676	73,955	73,695	(721)	260	97,708	97,708	0
Contingency											11,534	11,534	0
Total	2,658	1,159	1,053	(1,499)	105	74,676	73,955	73,695	(721)	260	109,242	109,242	0

NuMI Project TEC

($000's Omitted)

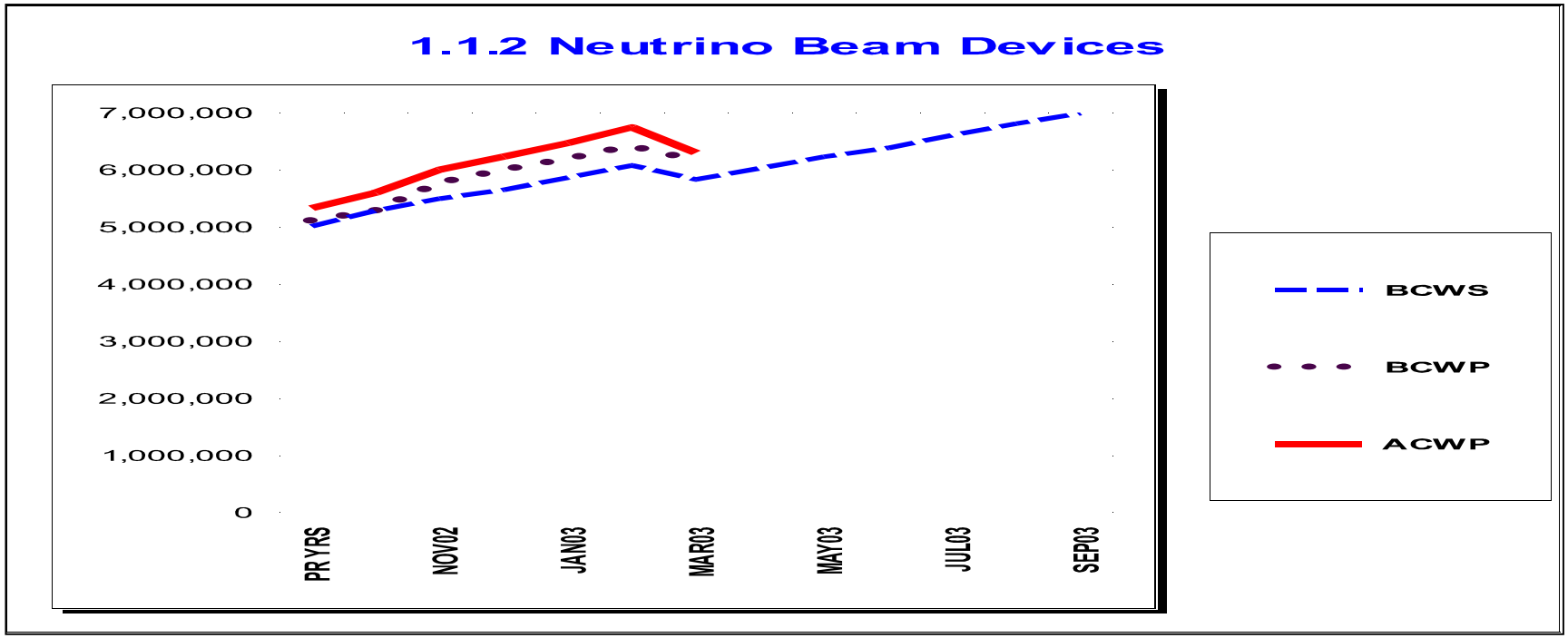
Cost Performance Report - Baseline																
Contractor:	Fermi National Accelerator Laboratory				Contract Type/No:			Project Name/No:				Report Period:				
Location:	Batavia							NuMI TEC				2/28/03		3/31/03		
(1) Original Contract Target Cost		(2) Negotiated Contract Changes		(3) Current Target Cost		(4) Est. Cost Authorized Authorized Unpriced Work		(5) Contract Budget Base (3) + (4)				(6) Total Allocated Budget		(7) Difference (5) - (6)		
76,200		33,042		109,242		0		109,242				109,242		0		
(8)Contract Start Date 10/1/97		(9) Contract Definitization Date 9/30/03				(10) Last Item Delivery Date 9/30/03			(11) Contract Completion Date 9/30/03				(12)Estimated Completion Date 9/30/03			
Item	BCWS Cum to Date	BCWS for Report Period	Budgeted Cost for Work Scheduled (Non-Cumulative) Six Month Forecast +1 APR03	+2 MAY03	+3 JUN03	+4 JUL03	+5 AUG03	+6 SEP03	(Enter Specific Periods) FY04	FY05				Undist Budget	Total Budget
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
PM Baseline (Beginning of Period)	72,018	3,011	2,601	2,245	2,032	2,309	1,802	1,240	9,756	1,046	0	0	0	0	98,061
225 Remove Spare Scope & Decrease Cost Overruns															(353)
PM Baseline (End of Period)	74,676		2,601	2,245	2,032	2,309	1,802	1,240	9,756	1,046	0	0	0	0	97,708
Contingency															11,534
Total															109,242

NuMI Project TEC



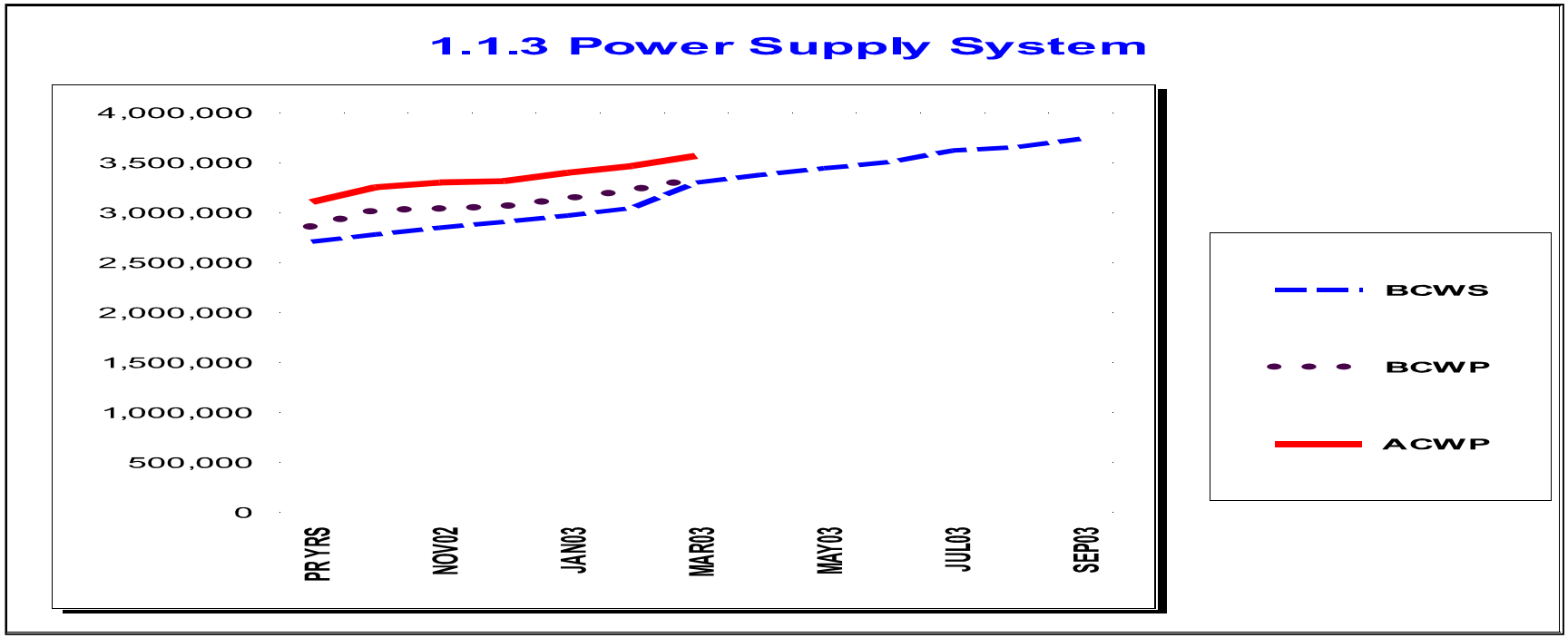
	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	1,513,162	1,587,069	1,692,961	1,814,443	1,953,594	2,058,822	2,332,564	2,706,726	3,093,182	3,277,787	3,386,749	3,554,348	3,698,897
BCWP	1,810,395	2,183,070	2,224,925	2,252,566	2,351,729	2,447,147	2,569,748						
ACWP	1,778,022	1,924,705	2,024,518	2,121,288	2,261,840	2,466,401	2,624,380						

NuMI Project TEC



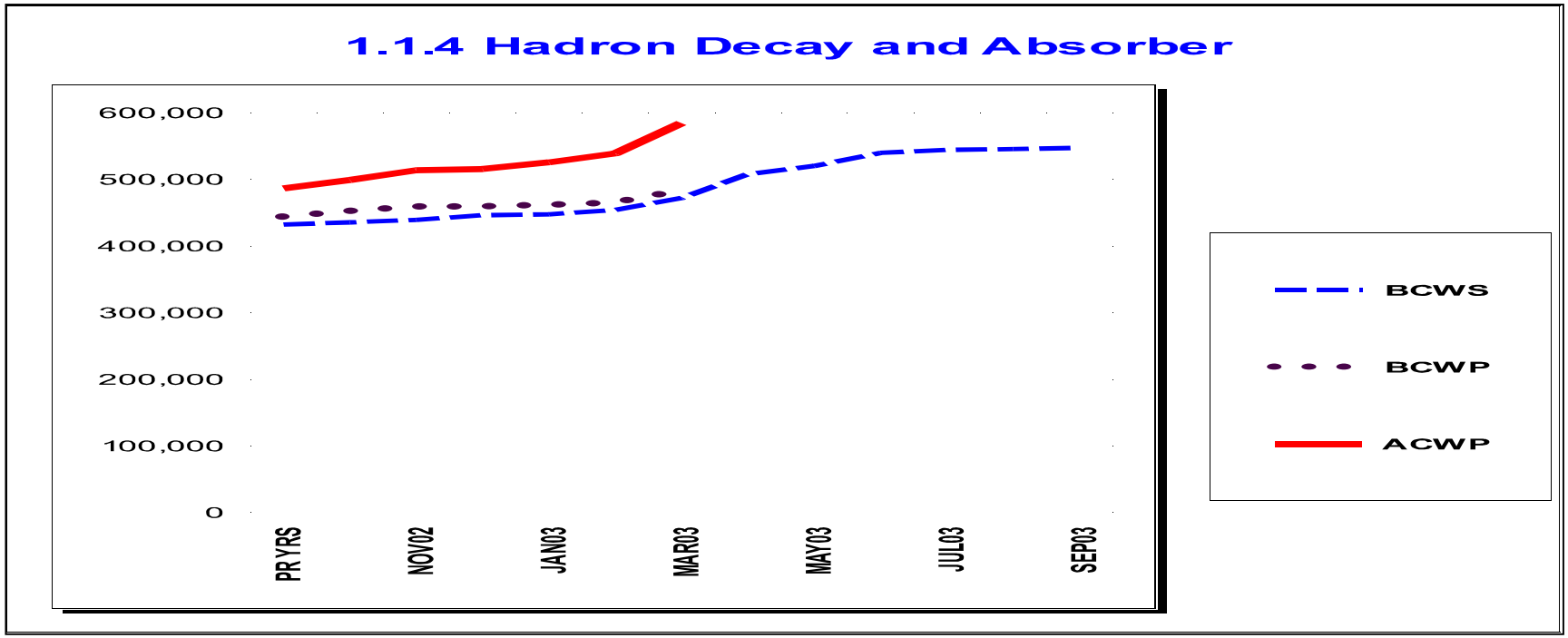
	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	5,009,741	5,285,563	5,494,435	5,647,779	5,862,752	6,076,031	5,829,382	6,026,758	6,226,810	6,382,152	6,604,550	6,805,423	6,989,832
BCWP	5,104,766	5,274,444	5,764,129	5,991,192	6,183,998	6,411,032	6,160,884						
ACWP	5,328,861	5,598,163	6,000,795	6,229,971	6,466,884	6,742,498	6,295,092						

NuMI Project TEC



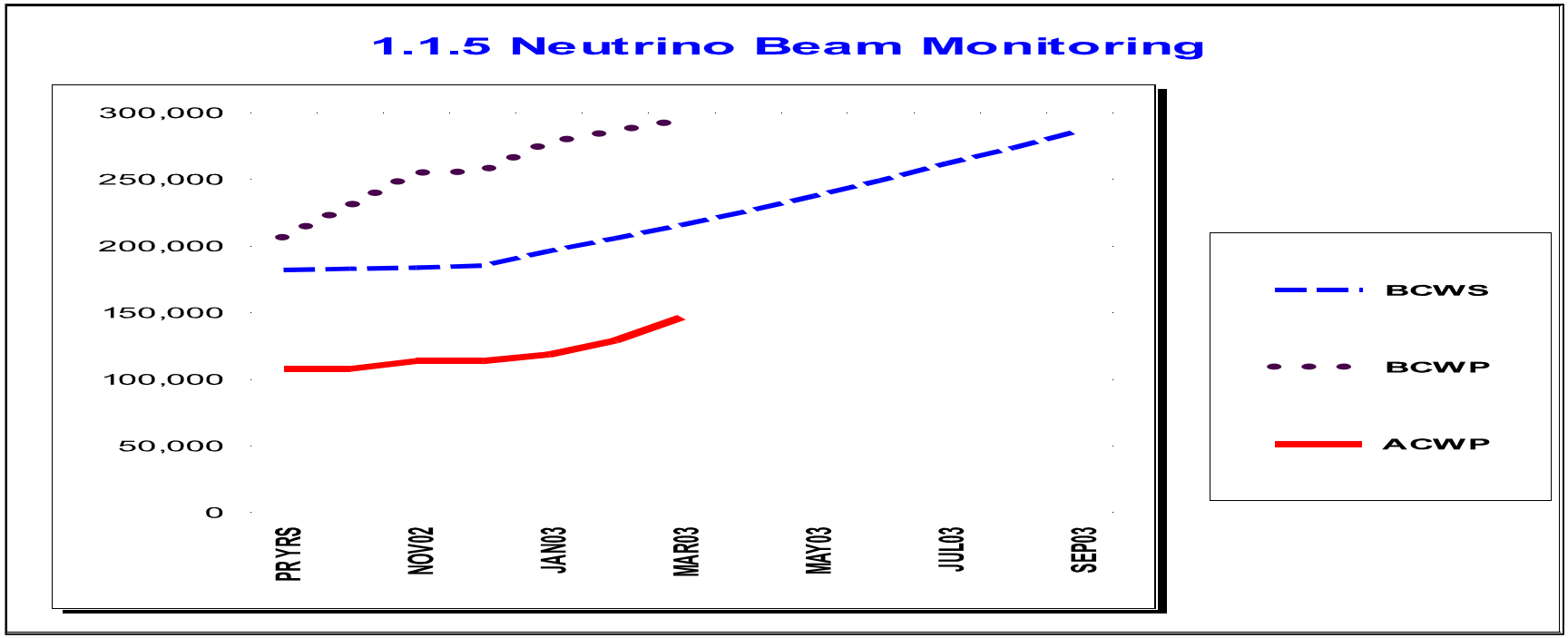
	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	2,707,746	2,780,976	2,848,786	2,907,273	2,971,319	3,045,508	3,299,833	3,376,634	3,442,695	3,503,324	3,620,166	3,655,058	3,736,541
BCWP	2,856,219	3,019,133	3,034,671	3,058,146	3,136,873	3,219,085	3,331,672						
ACWP	3,105,320	3,252,383	3,300,953	3,313,957	3,398,115	3,465,986	3,567,524						

NuMI Project TEC



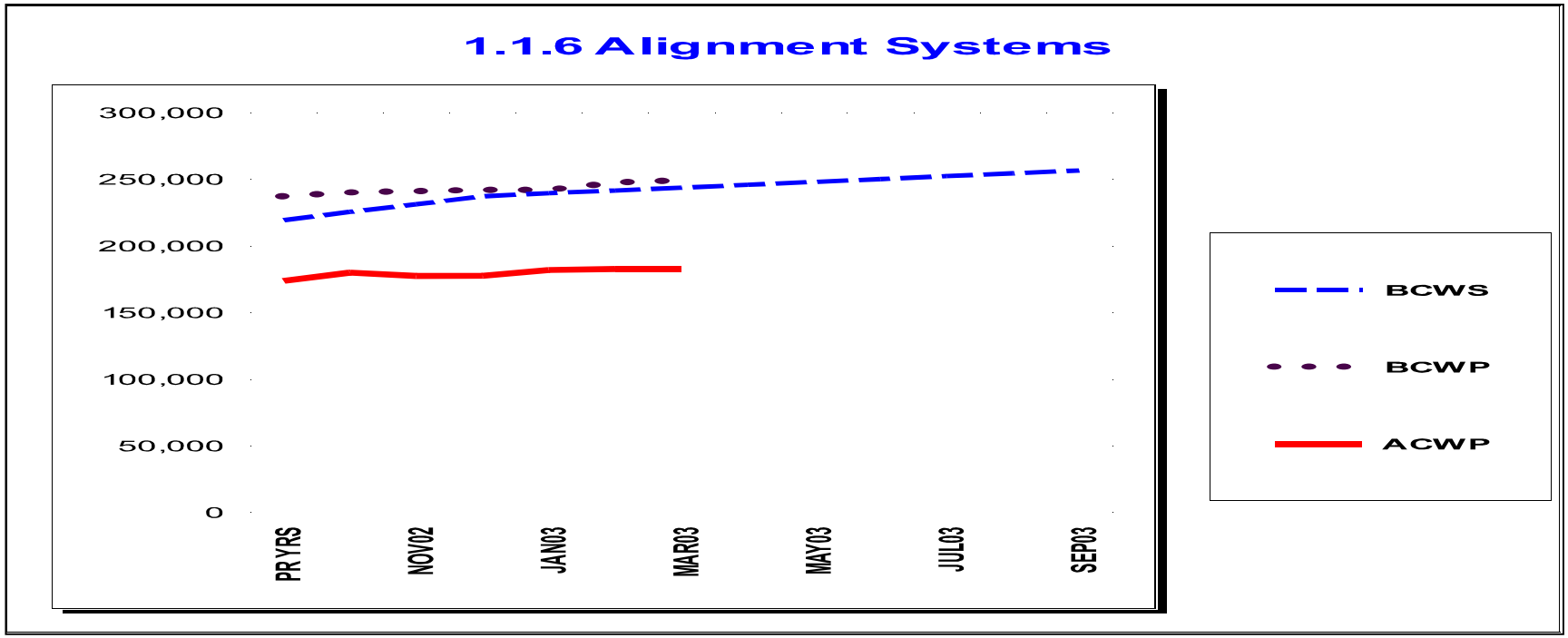
	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	432,094	435,274	439,165	446,031	447,366	453,971	471,880	507,729	519,884	539,535	544,148	545,263	546,987
BCWP	443,282	451,851	458,424	458,424	460,931	464,510	482,245						
ACWP	486,142	498,915	513,474	515,291	525,342	538,739	584,154						

NuMI Project TEC



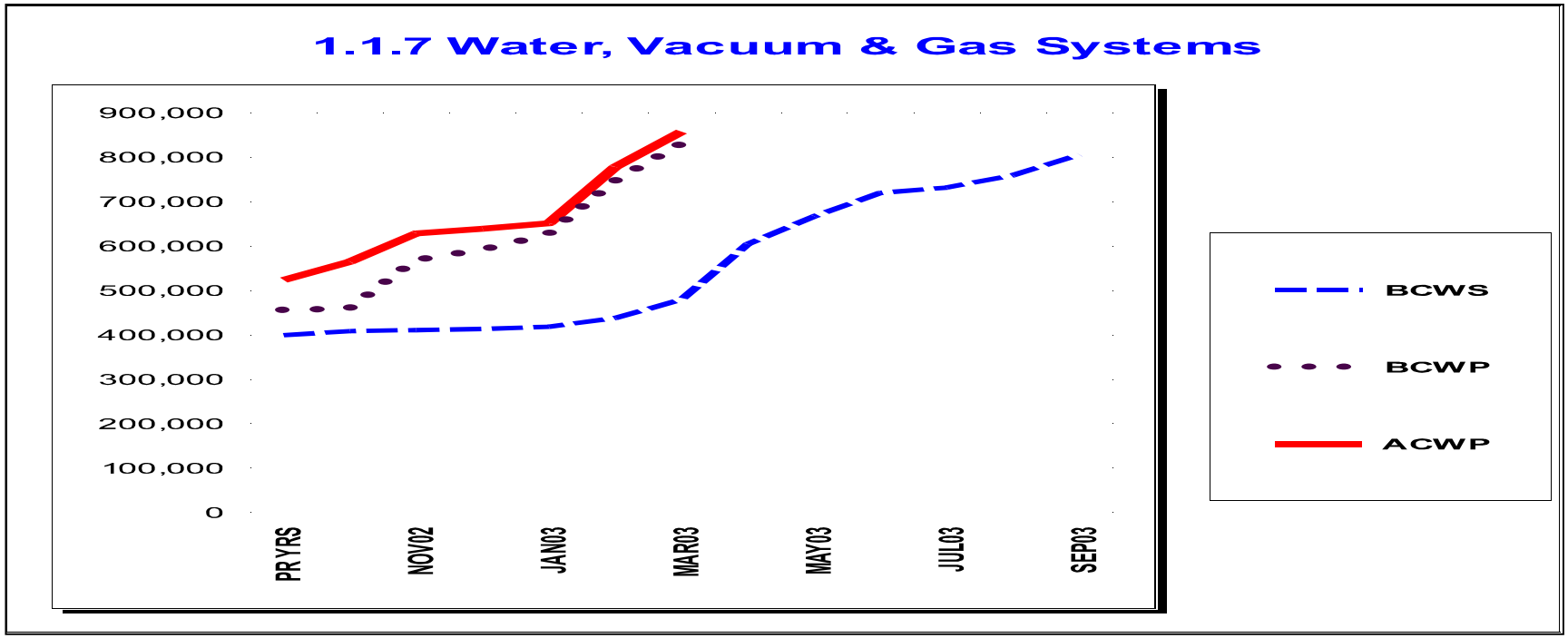
	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	181,931	182,824	183,639	185,195	196,152	205,680	215,684	226,165	237,472	249,133	261,904	273,565	286,457
BCWP	206,151	229,429	254,647	255,517	277,271	285,733	294,079						
ACWP	107,751	107,751	113,606	113,612	118,443	129,025	146,392						

NuMI Project TEC



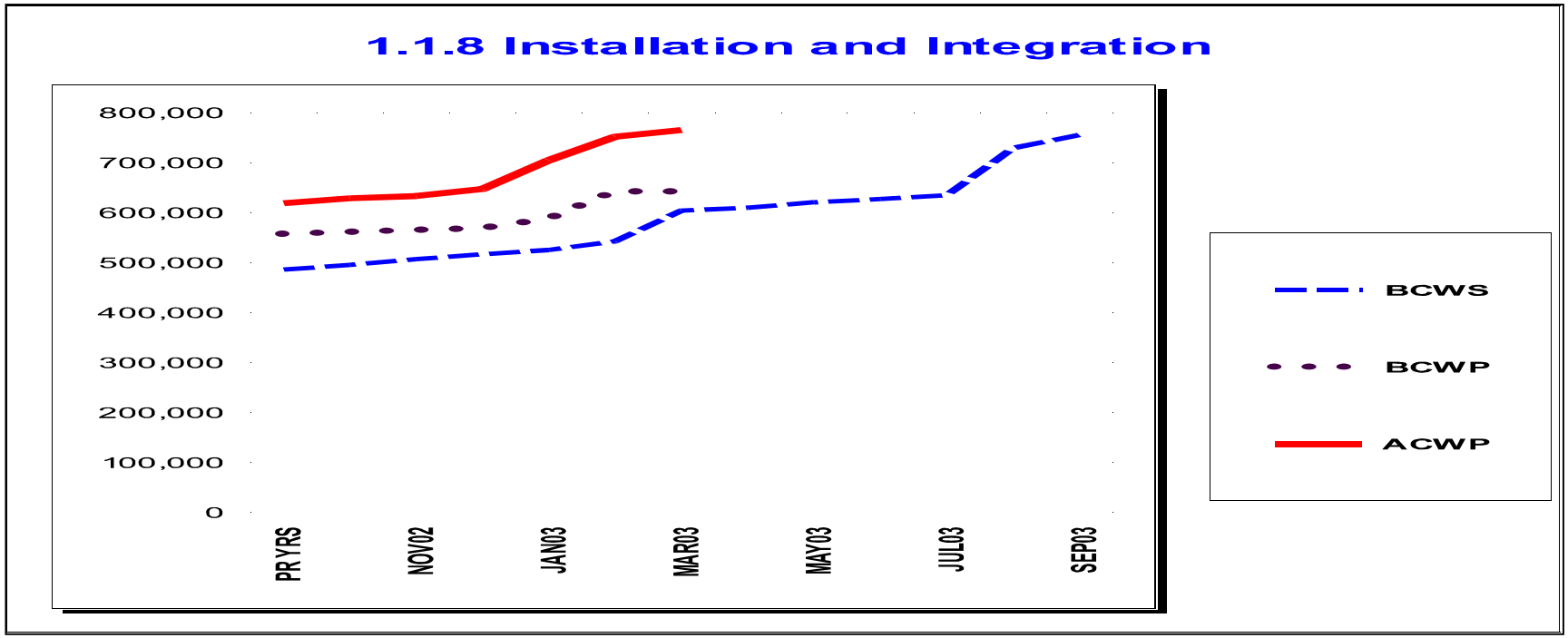
	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	219,263	225,509	231,211	237,185	239,590	241,570	243,650	245,828	248,006	250,085	252,362	254,442	256,620
BCWP	236,780	239,695	240,667	241,639	241,639	247,047	248,990						
ACWP	173,750	179,969	177,462	177,603	181,869	182,729	182,729						

NuMI Project TEC



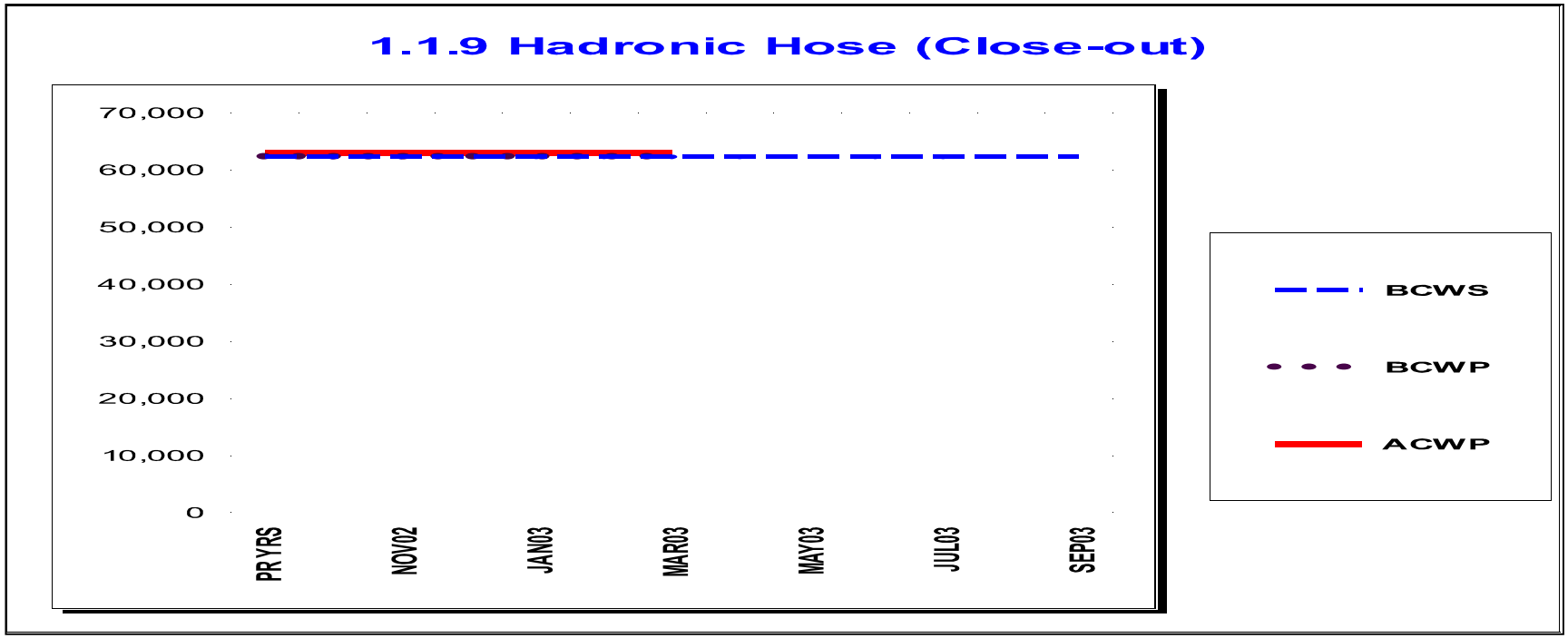
	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	399,019	408,335	410,528	413,127	418,105	437,739	478,996	604,159	666,492	719,328	731,329	759,128	805,558
BCWP	454,988	457,637	566,852	590,204	624,621	744,342	828,144						
ACWP	523,241	564,372	628,116	638,377	650,901	777,619	857,414						

NuMI Project TEC



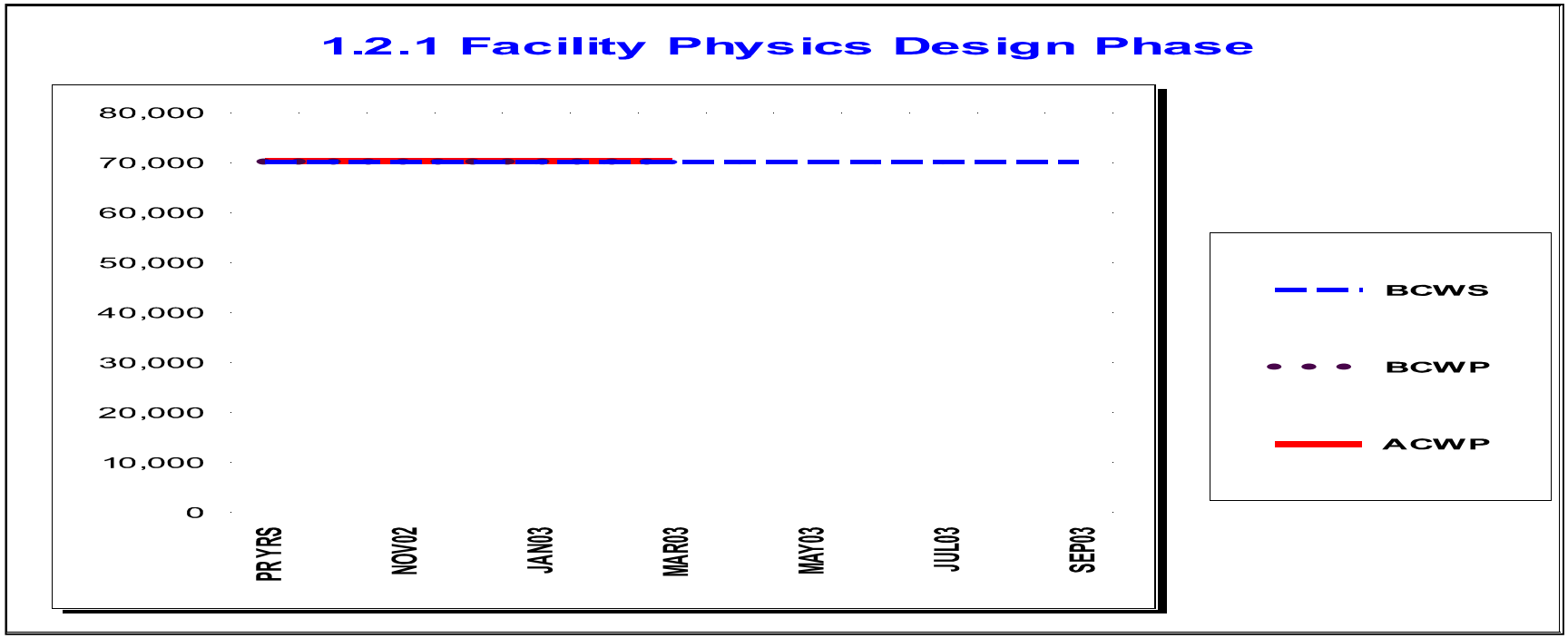
	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	485,793	495,379	506,790	516,654	525,217	542,512	604,030	609,569	620,530	626,989	634,716	729,100	755,019
BCWP	556,824	560,262	564,611	567,935	586,648	641,445	641,445						
ACWP	618,710	628,680	633,106	647,029	704,803	751,868	765,285						

NuMI Project TEC

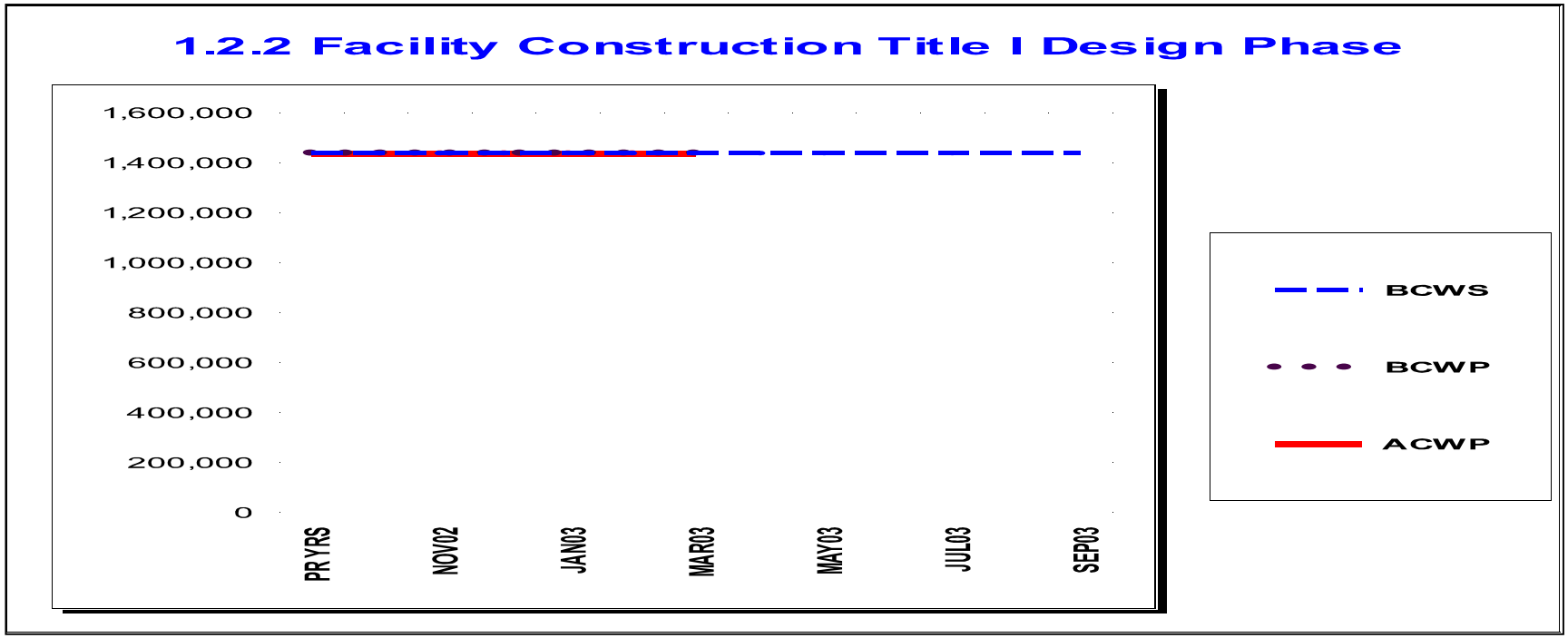


	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	62,263	62,263	62,263	62,263	62,263	62,263	62,263	62,263	62,263	62,263	62,263	62,263	62,263
BCWP	62,263	62,263	62,263	62,263	62,263	62,263	62,263						
ACWP	62,884	62,884	62,884	62,884	62,884	62,884	62,884						

NuMI Project TEC

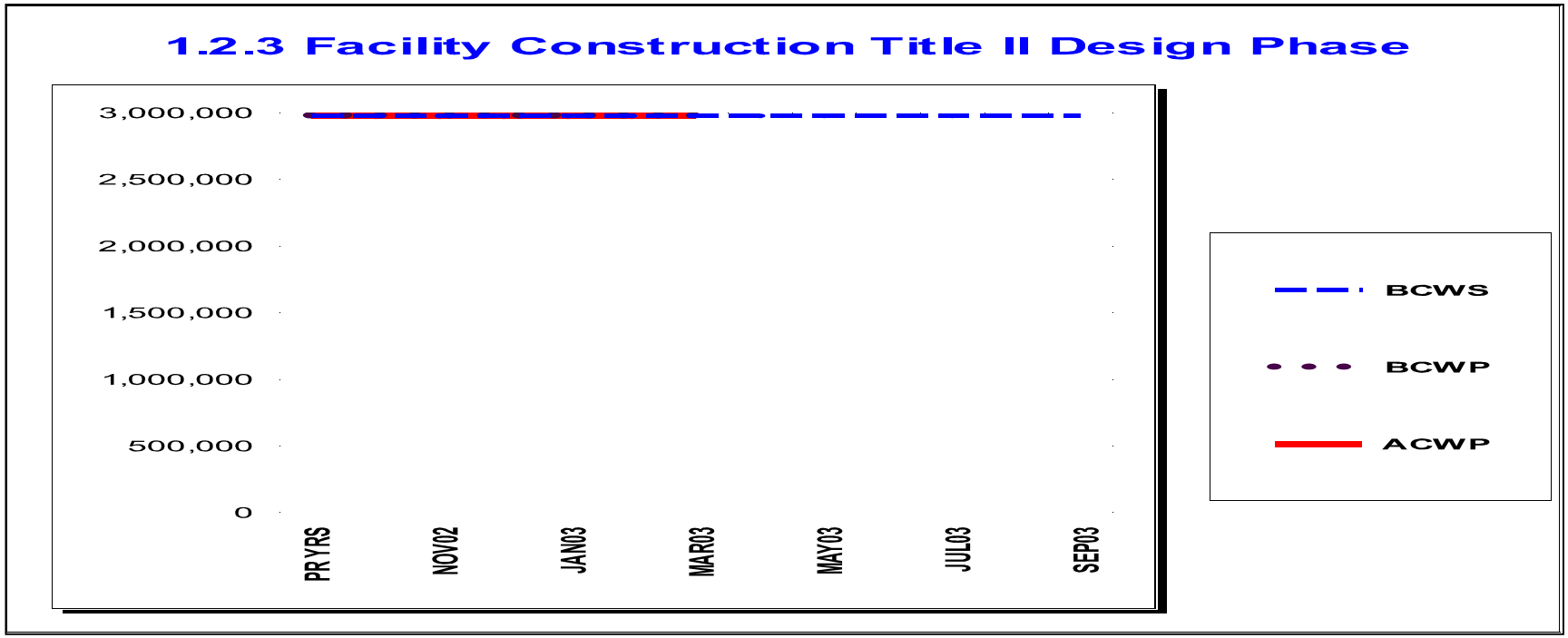


	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	70,107	70,107	70,107	70,107	70,107	70,107	70,107	70,107	70,107	70,107	70,107	70,107	70,107
BCWP	70,107	70,107	70,107	70,107	70,107	70,107	70,107						
ACWP	70,362	70,362	70,362	70,362	70,362	70,362	70,362						



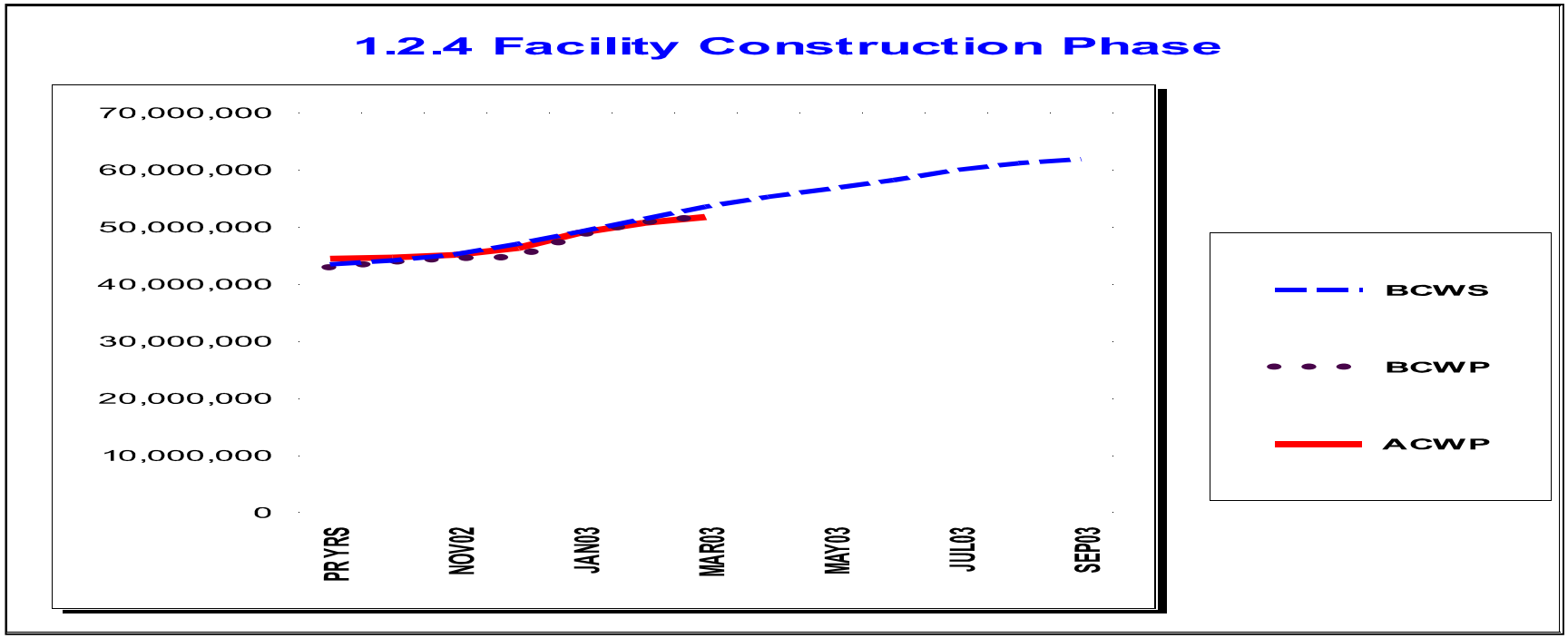
	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	1,438,066	1,438,066	1,438,066	1,438,066	1,438,066	1,438,066	1,438,066	1,438,066	1,438,066	1,438,066	1,438,066	1,438,066	1,438,066
BCWP	1,438,066	1,438,066	1,438,066	1,438,066	1,438,066	1,438,066	1,438,066						
ACWP	1,436,846	1,436,846	1,436,846	1,436,846	1,436,846	1,436,846	1,436,846						

NuMI Project TEC



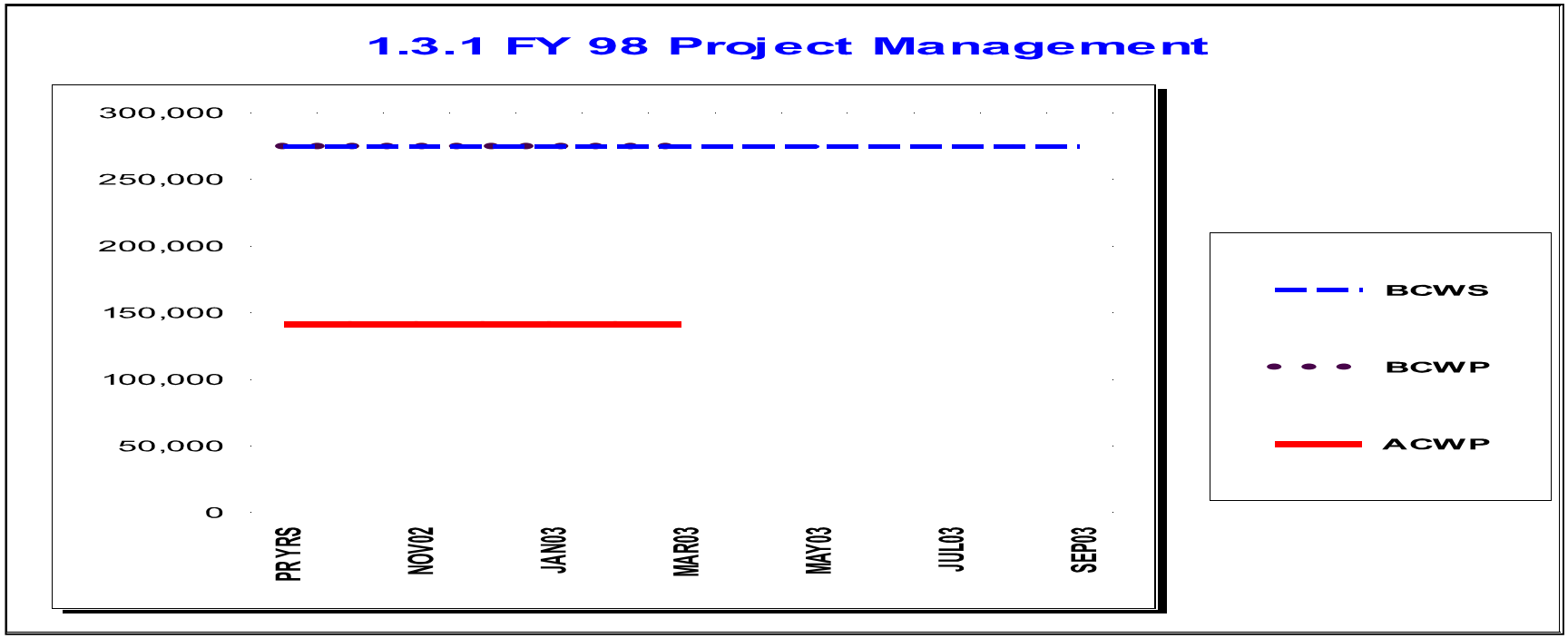
	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	2,975,388	2,975,388	2,975,388	2,975,388	2,975,388	2,975,388	2,975,388	2,975,388	2,975,388	2,975,388	2,975,388	2,975,388	2,975,388
BCWP	2,975,388	2,975,388	2,975,388	2,975,388	2,975,388	2,975,388	2,975,388						
ACWP	2,974,283	2,974,283	2,974,283	2,974,283	2,974,283	2,974,283	2,974,283						

NuMI Project TEC



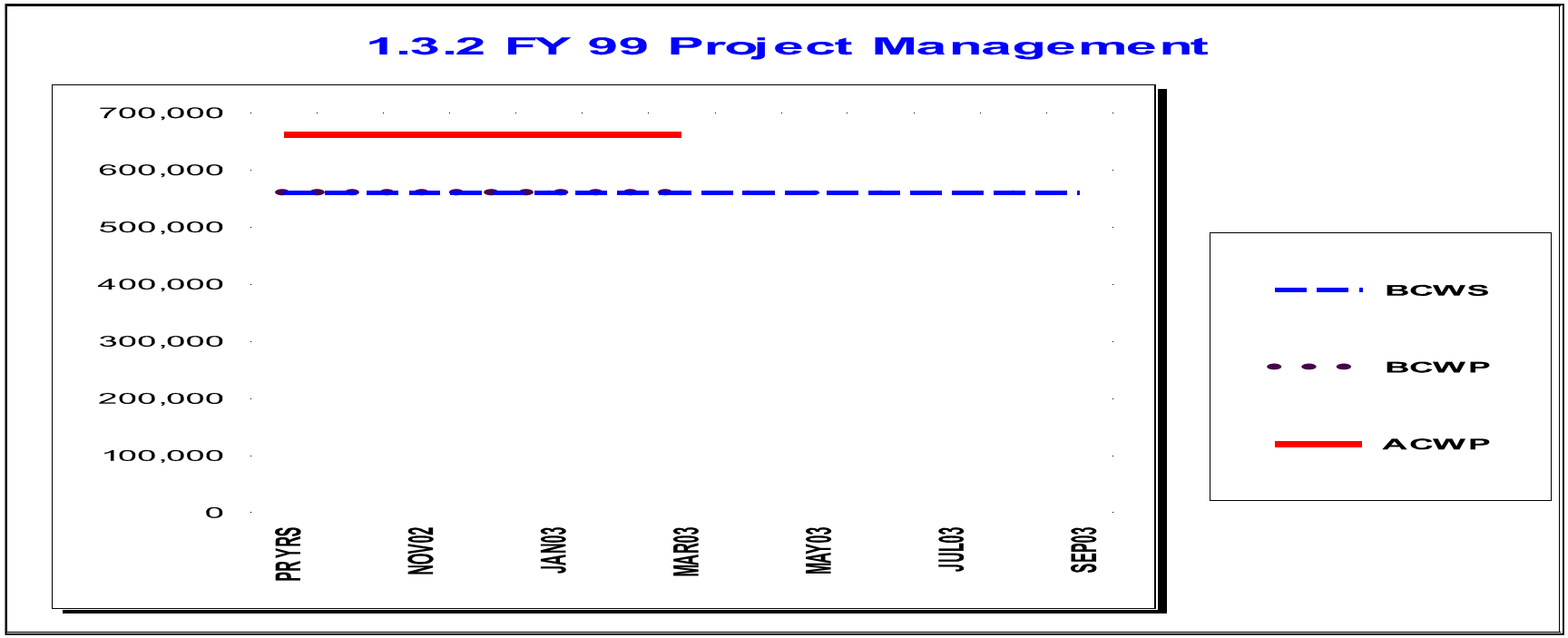
	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	43,435,387	44,124,732	45,189,943	47,037,264	49,180,446	51,342,222	53,534,537	55,254,187	56,693,806	58,180,512	59,945,103	61,155,594	61,842,304
BCWP	42,833,478	43,782,507	44,450,875	44,648,661	48,497,883	50,722,474	51,732,648						
ACWP	44,436,111	44,632,426	45,098,681	46,323,663	48,995,027	50,680,710	51,725,414						

NuMI Project TEC



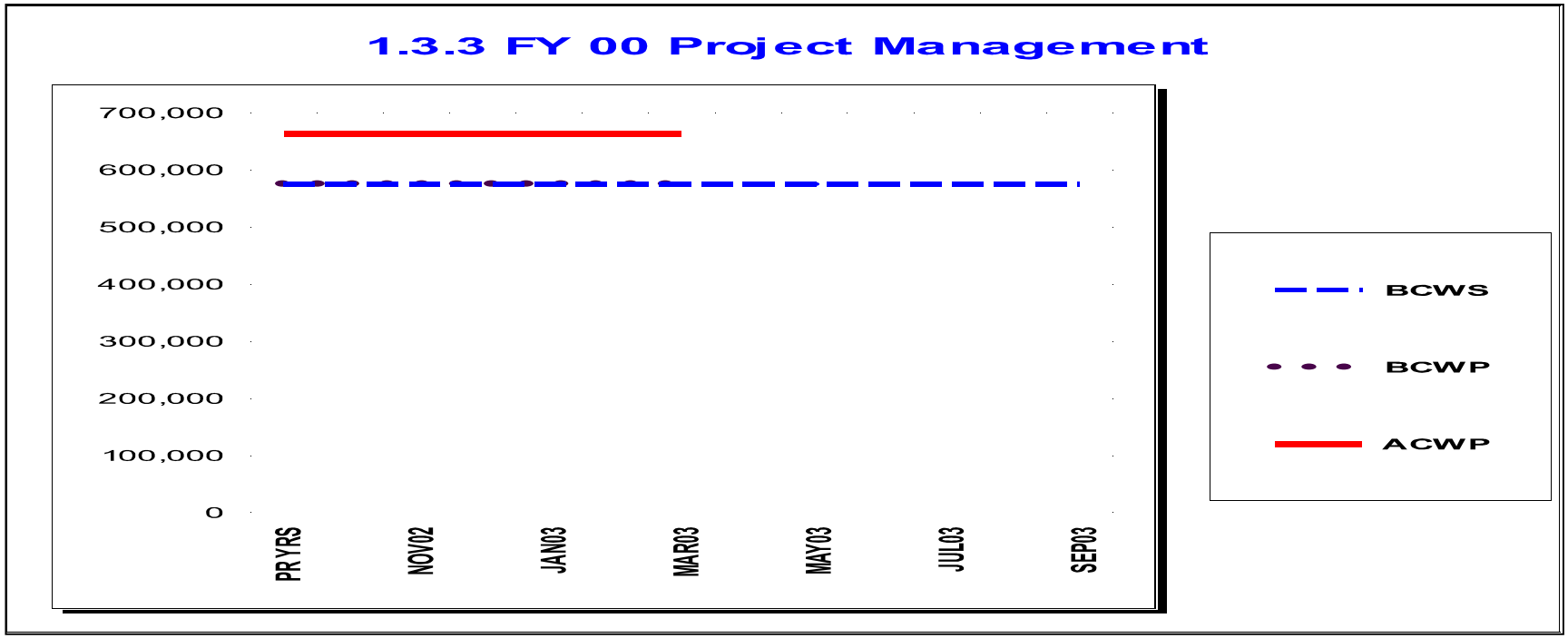
	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	274,570	274,570	274,570	274,570	274,570	274,570	274,570	274,570	274,570	274,570	274,570	274,570	274,570
BCWP	274,570	274,570	274,570	274,570	274,570	274,570	274,570						
ACWP	141,385	141,385	141,385	141,385	141,385	141,385	141,385						

NuMI Project TEC



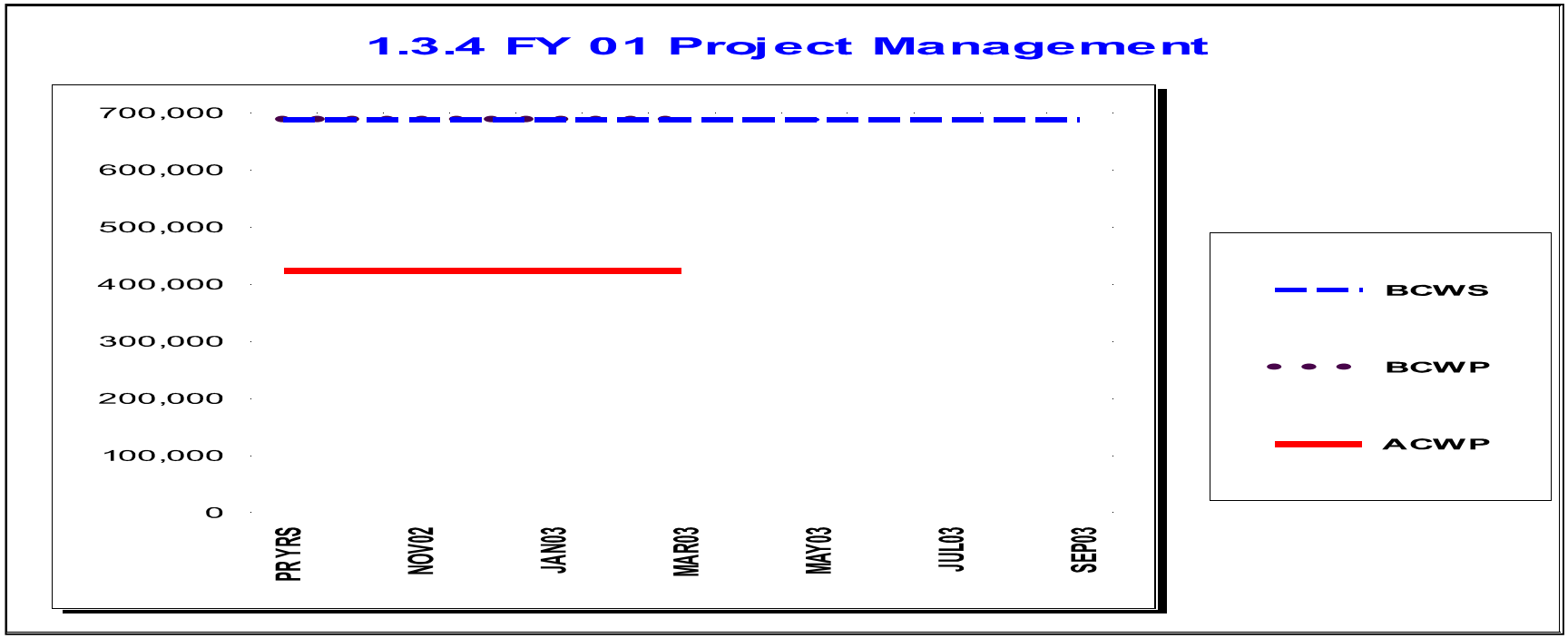
	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	559,872	559,872	559,872	559,872	559,872	559,872	559,872	559,872	559,872	559,872	559,872	559,872	559,872
BCWP	559,872	559,872	559,872	559,872	559,872	559,872	559,872						
ACWP	661,403	661,403	661,403	661,403	661,403	661,403	661,403						

NuMI Project TEC



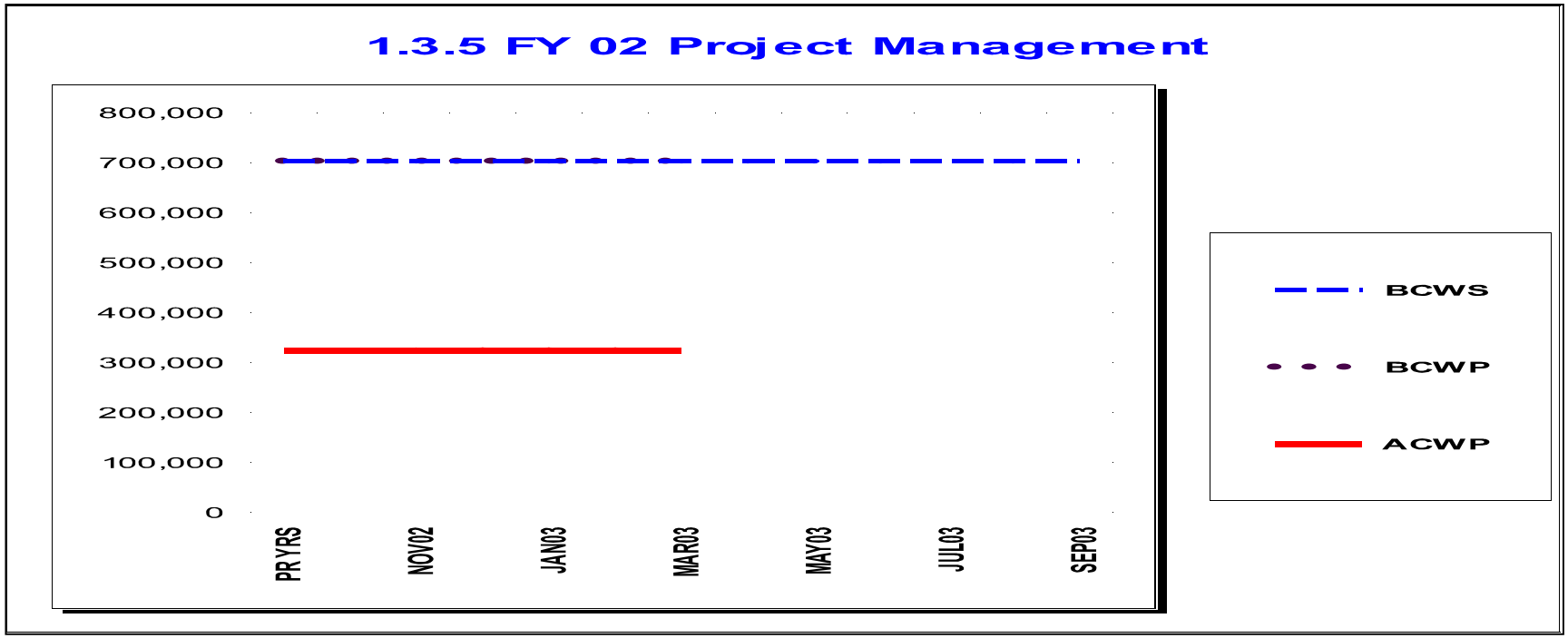
	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	574,984	574,984	574,984	574,984	574,984	574,984	574,984	574,984	574,984	574,984	574,984	574,984	574,984
BCWP	574,984	574,984	574,984	574,984	574,984	574,984	574,984						
ACWP	662,816	662,816	662,816	662,816	662,816	662,816	662,816						

NuMI Project TEC



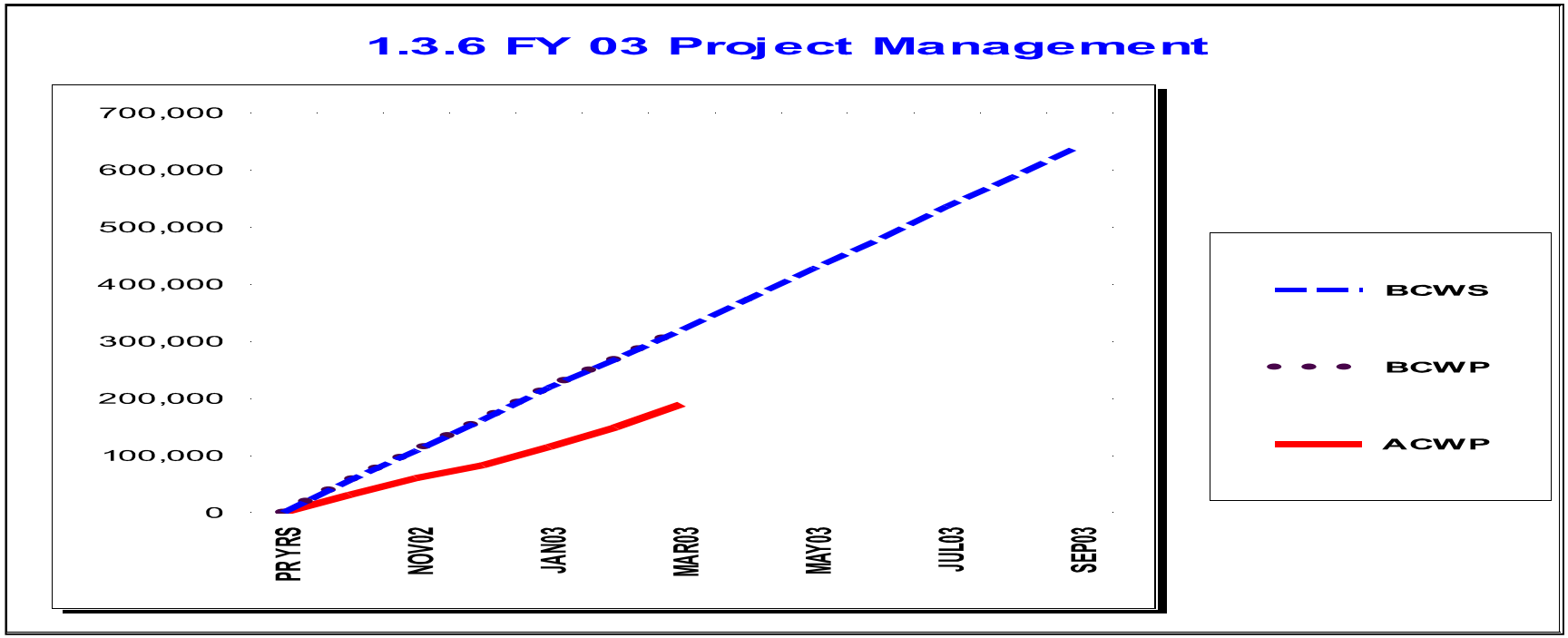
	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	687,739	687,739	687,739	687,739	687,739	687,739	687,739	687,739	687,739	687,739	687,739	687,739	687,739
BCWP	687,739	687,739	687,739	687,739	687,739	687,739	687,739						
ACWP	422,648	422,648	422,648	422,648	422,648	422,648	422,648						

NuMI Project TEC



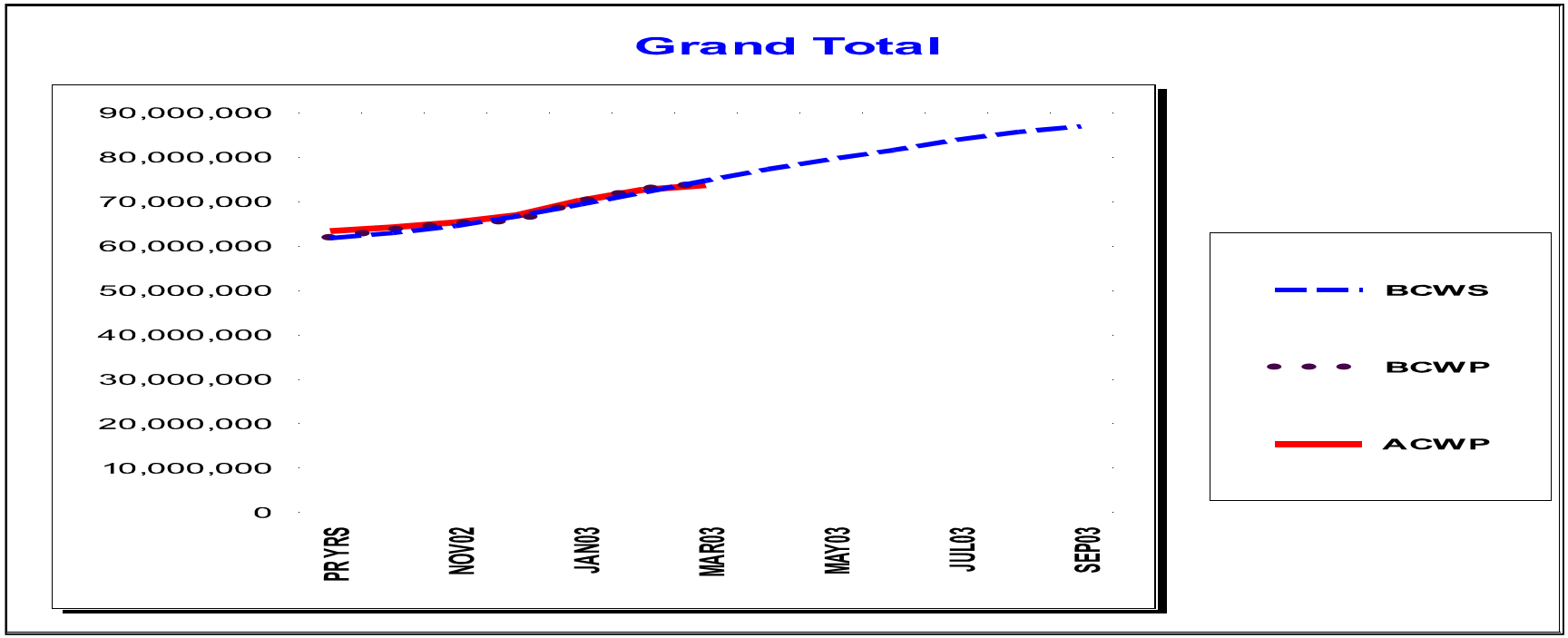
	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	702,766	702,766	702,766	702,766	702,766	702,766	702,766	702,766	702,766	702,766	702,766	702,766	702,766
BCWP	702,766	702,766	702,766	702,766	702,766	702,766	702,766						
ACWP	324,373	324,373	324,431	324,431	324,431	324,431	324,431						

NuMI Project TEC



	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	0	56,514	108,115	162,172	218,686	267,830	319,430	373,487	427,544	479,145	535,659	587,259	641,317
BCWP	0	56,514	108,115	162,172	218,686	267,829	319,430						
ACWP	0	30,970	60,324	82,634	114,746	148,926	189,519						

NuMI Project TEC



	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	61,729,892	62,927,930	64,451,328	66,712,877	69,358,982	72,017,639	74,675,740	77,276,997	79,522,177	81,553,746	83,862,441	85,664,935	86,905,288
BCWP	61,848,637	63,600,298	65,013,671	65,572,211	69,926,033	72,796,400	73,955,040						
ACWP	63,314,909	64,175,336	65,308,093	66,920,483	70,175,027	72,641,559	73,694,960						

NuMI Project TEC

($000's Omitted)

Program:	Description:	Approval:
NUMITEC	NuMI TEC	Program Manager
Run Date: 04/18/03	Status Date: 3/31/2003	Functional Manager
		Cost Account Manager

DESCRIPTION		PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03	FY04	FY05	TOTAL
1.1 Technical Components																	
1.1.1 Extraction & Primary Beam	BCWS	1,513	74	106	121	139	105	274	374	386	185	109	168	145	976	12	4,687
	ACWP	1,778	147	100	97	141	205	158	0	0	0	0	0	0	0	0	2,624
1.1.2 Neutrino Beam Devices	BCWS	5,010	276	209	153	215	213	-247	197	200	155	222	201	184	2,657	166	9,813
	ACWP	5,329	269	403	229	237	276	-447	0	0	0	0	0	0	0	0	6,295
1.1.3 Power Supply System	BCWS	2,708	73	68	58	64	74	254	77	66	61	117	35	81	762	2	4,500
	ACWP	3,105	147	49	13	84	68	102	0	0	0	0	0	0	0	0	3,568
1.1.4 Hadron Decay and Absorber	BCWS	432	3	4	7	1	7	18	36	12	20	5	1	2	647	252	1,445
	ACWP	486	13	15	2	10	13	45	0	0	0	0	0	0	0	0	584
1.1.5 Neutrino Beam Monitoring	BCWS	182	1	1	2	11	10	10	10	11	12	13	12	13	167	28	481
	ACWP	108	0	6	0	5	11	17	0	0	0	0	0	0	0	0	146
1.1.6 Alignment Systems	BCWS	219	6	6	6	2	2	2	2	2	2	2	2	2	38	13	308
	ACWP	174	6	-3	0	4	1	0	0	0	0	0	0	0	0	0	183
1.1.7 Water, Vacuum & Gas Systems	BCWS	399	9	2	3	5	20	41	125	62	53	12	28	46	1,353	26	2,185
	ACWP	523	41	64	10	13	127	80	0	0	0	0	0	0	0	0	857
1.1.8 Installation and Integration	BCWS	486	10	11	10	9	17	62	6	11	6	8	94	26	1,765	219	2,738
	ACWP	619	10	4	14	58	47	13	0	0	0	0	0	0	0	0	765
1.1.9 Hadronic Hose (Close-out)	BCWS	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62
	ACWP	63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63
WBS[2] Totals:	BCWS	11,011	452	407	360	446	448	414	828	752	493	488	540	500	8,364	716	26,219
	ACWP	12,185	633	637	365	551	747	-32	0	0	0	0	0	0	0	0	15,086
1.2 Facility Construction																	
1.2.1 Facility Physics Design Phase	BCWS	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70
	ACWP	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70
1.2.2 Facility Construction Title I Design Phase	BCWS	1,438	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,438
	ACWP	1,437	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,437
1.2.3 Facility Construction Title II Design Phase	BCWS	2,975	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,975
	ACWP	2,974	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,974
1.2.4 Facility Construction Phase	BCWS	43,435	689	1,065	1,847	2,143	2,162	2,192	1,720	1,440	1,487	1,765	1,210	687	733	0	62,576
	ACWP	44,436	196	466	1,225	2,671	1,686	1,045	0	0	0	0	0	0	0	0	51,725
WBS[2] Totals:	BCWS	47,919	689	1,065	1,847	2,143	2,162	2,192	1,720	1,440	1,487	1,765	1,210	687	733	0	67,059
	ACWP	48,918	196	466	1,225	2,671	1,686	1,045	0	0	0	0	0	0	0	0	56,207
1.3 Project Management																	
1.3.1 FY 98 Project Management	BCWS	275	0	0	0	0	0	0	0	0	0	0	0	0	0	0	275
	ACWP	141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	141
1.3.2 FY 99 Project Management	BCWS	560	0	0	0	0	0	0	0	0	0	0	0	0	0	0	560
	ACWP	661	0	0	0	0	0	0	0	0	0	0	0	0	0	0	661
1.3.3 FY 00 Project Management	BCWS	575	0	0	0	0	0	0	0	0	0	0	0	0	0	0	575
	ACWP	663	0	0	0	0	0	0	0	0	0	0	0	0	0	0	663
1.3.4 FY 01 Project Management	BCWS	688	0	0	0	0	0	0	0	0	0	0	0	0	0	0	688
	ACWP	423	0	0	0	0	0	0	0	0	0	0	0	0	0	0	423

NuMI Project TEC

($000's Omitted)

Program:	Description:	Approval:
NUMITEC	NuMI TEC	Program Manager
Run Date: 04/18/03	Status Date: 3/31/2003	Functional Manager
		Cost Account Manager

DESCRIPTION		PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03	FY04	FY05	TOTAL
1.3.5 FY 02 Project Management	BCWS	703	0	0	0	0	0	0	0	0	0	0	0	0	0	0	703
	ACWP	324	0	0	0	0	0	0	0	0	0	0	0	0	0	0	324
1.3.6 FY 03 Project Management	BCWS	0	57	52	54	57	49	52	54	54	52	57	52	54	0	0	641
	ACWP	0	31	29	22	32	34	41	0	0	0	0	0	0	0	0	190
1.3.7 FY 04 Project Management	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	658	0	658
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.3.8 FY 05 Project Management	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	330	330
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WBS[2] Totals:	BCWS	2,800	57	52	54	57	49	52	54	54	52	57	52	54	658	330	4,430
	ACWP	2,213	31	29	22	32	34	41	0	0	0	0	0	0	0	0	2,402
Grand Totals:	BCWS	61,730	1,198	1,523	2,262	2,646	2,659	2,658	2,601	2,245	2,032	2,309	1,802	1,240	9,756	1,046	97,708
	ACWP	63,315	860	1,133	1,612	3,255	2,467	1,053	0	0	0	0	0	0	0	0	73,695

NuMI Other Project Costs

($000's Omitted)

Cost Performance Report - Work Breakdown Structure													
Contractor: Fermi National Accelerator Laboratory					Contract Type/No:			Project Name/No:		Report Period:			
Location: Batavia								NuMI Other Proj Costs		2/28/03	3/31/03		
Quantity	Negotiated Cost		Est. Cost Authorized Unpriced Work		Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling		
1	62,200		0		0	0	62,200	0		0	0		
WBS[2]	Current Period					Cumulative to Date					At Completion		
WBS[3]	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance			Latest	
Results...	Work	Work	Work			Work	Work	Work				Revised	
Item	Scheduled	Performed	Performed	Schedule	Cost	Scheduled	Performed	Performed	Schedule	Cost	Budgeted	Estimate	Variance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
2.1 Magnets: Steel & Coils													
2.1.1 Steel Plane Fabrication													
Direct Cost + Escalation	160	66	18	(94)	48	3,908	4,294	4,177	387	117	4,406	4,406	0
Indirect Cost	3	3	2	(0)	1	221	229	220	8	8	235	235	0
WBS[3]Totals:	164	69	20	(94)	49	4,128	4,523	4,398	395	125	4,642	4,642	0
2.1.2 Steel handling fixtures													
Direct Cost + Escalation	0	0	0	0	0	620	620	637	(0)	(17)	620	620	0
Indirect Cost	0	0	0	0	0	153	153	157	0	(3)	153	153	0
WBS[3]Totals:	0	0	0	0	0	773	773	793	0	(20)	773	773	0
2.1.3 Near Detector Support Structures													
Direct Cost + Escalation	0	0	0	0	0	0	0	1	0	(1)	0	0	0
Indirect Cost	0	0	0	0	0	4	4	0	0	4	4	4	0
WBS[3]Totals:	0	0	0	0	0	5	5	1	0	3	5	5	0
2.1.4 Magnet Coil													
Direct Cost + Escalation	5	0	0	(5)	(0)	1,301	1,291	1,369	(10)	(78)	1,301	1,301	0
Indirect Cost	1	0	0	(1)	0	274	271	300	(3)	(29)	274	274	0
WBS[3]Totals:	6	0	0	(6)	(0)	1,575	1,562	1,669	(13)	(107)	1,575	1,575	0
2.1.5 Detector Plane Prototypes													
Direct Cost + Escalation	0	0	0	0	0	394	394	394	0	0	394	394	0
Indirect Cost	0	0	0	0	0	106	106	102	(0)	5	106	106	0
WBS[3]Totals:	0	0	0	0	0	501	501	496	(0)	5	501	501	0
2.1.6 Steel Management													
Direct Cost + Escalation	0	0	0	0	0	64	64	52	0	12	66	66	0
Indirect Cost	0	0	0	0	0	5	5	5	0	1	6	6	0
WBS[3]Totals:	0	0	0	0	0	70	70	56	0	13	71	71	0
WBS[2]Totals:	170	70	21	(101)	49	7,051	7,433	7,413	382	19	7,566	7,566	0
2.2 Scintillator Detector Fabrication													
2.2.1 Scintillator Strips													
Direct Cost + Escalation	0	0	1	0	(1)	2,912	2,912	2,867	0	45	2,912	2,912	0
Indirect Cost	0	0	0	0	(0)	270	270	289	0	(19)	270	270	0
WBS[3]Totals:	0	0	1	0	(1)	3,182	3,182	3,156	0	26	3,182	3,182	0
2.2.2 Fiber													
Direct Cost + Escalation	0	3	97	3	(93)	4,313	4,305	4,168	(8)	136	4,313	4,313	0
Indirect Cost	0	0	0	0	(0)	61	61	26	0	35	61	61	0
WBS[3]Totals:	0	3	97	3	(94)	4,374	4,366	4,194	(8)	171	4,374	4,374	0
2.2.3 Scintillator Modules													
Direct Cost + Escalation	0	0	0	0	0	1,925	1,925	1,864	0	61	1,925	1,925	0

NuMI Other Project Costs

($000's Omitted)

Cost Performance Report - Work Breakdown Structure

Contractor:	Fermi National Accelerator Laboratory				Contract Type/No:			Project Name/No:		Report Period:		
Location:	Batavia							NuMI Other Proj Costs		2/28/03	3/31/03	
Quantity	Negotiated Cost		Est. Cost Authorized Unpriced Work		Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling	
1	62,200		0		0	0	62,200	0		0	0	
WBS[2]	Current Period						Cumulative to Date				At Completion	
WBS[3] Results...	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance			Latest Revised Estimate	
Item	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Budgeted		Variance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Indirect Cost	0	0	0	0	(0)	84	84	89	0	(5)	84	84	0
WBS[3]Totals:	0	0	0	0	(0)	2,008	2,008	1,953	0	55	2,008	2,008	0
2.2.4 Photodetector Systems													
Direct Cost + Escalation	4	7	6	2	0	2,154	2,171	2,134	17	37	2,175	2,175	0
Indirect Cost	0	0	0	0	0	23	23	9	(0)	14	23	23	0
WBS[3]Totals:	4	7	6	2	0	2,177	2,195	2,143	17	52	2,198	2,198	0
2.2.5 Mux Boxes & Connectors													
Direct Cost + Escalation	6	24	17	18	6	1,353	1,328	1,353	(25)	(26)	1,368	1,368	0
Indirect Cost	0	0	0	0	0	23	23	23	0	(1)	23	23	0
WBS[3]Totals:	6	24	17	18	6	1,376	1,351	1,377	(25)	(26)	1,390	1,390	0
2.2.6 Calibration Systems													
Direct Cost + Escalation	0	0	0	(0)	0	1,126	1,105	1,103	(21)	3	1,126	1,126	0
Indirect Cost	0	0	0	0	0	1	1	0	0	1	1	1	0
WBS[3]Totals:	0	0	0	(0)	0	1,127	1,106	1,103	(21)	3	1,127	1,127	0
2.2.7 Ass'y & Test Equipment													
Direct Cost + Escalation	0	0	0	0	0	1,685	1,685	1,677	(0)	8	1,685	1,685	0
Indirect Cost	0	0	0	0	0	54	54	53	(0)	0	54	54	0
WBS[3]Totals:	0	0	0	0	0	1,739	1,739	1,731	(0)	8	1,739	1,739	0
2.2.8 Factories													
Direct Cost + Escalation	24	39	26	15	12	3,138	3,133	3,205	(5)	(71)	3,142	3,142	0
Indirect Cost	0	1	0	0	1	46	46	4	(0)	42	46	46	0
WBS[3]Totals:	24	39	26	15	13	3,184	3,179	3,209	(5)	(30)	3,188	3,188	0
2.2.9 Scintillator Management													
Direct Cost + Escalation	0	0	0	(0)	0	348	348	355	0	(7)	348	348	0
Indirect Cost	0	0	0	(0)	0	8	8	5	0	3	8	8	0
WBS[3]Totals:	0	0	0	(0)	0	355	355	359	0	(4)	355	355	0
WBS[2]Totals:	35	73	148	38	(75)	19,522	19,481	19,224	(41)	256	19,561	19,561	0
2.3 Electronics, DAQ & Database													
2.3.1 Near Detector Front End													
Direct Cost + Escalation	86	523	96	437	427	3,852	3,680	2,686	(172)	994	4,262	4,262	0
Indirect Cost	9	62	8	53	54	387	383	335	(4)	48	450	450	0
WBS[3]Totals:	95	585	104	490	481	4,239	4,063	3,021	(176)	1,042	4,712	4,712	0
2.3.2 Far Detector Front-end													
Direct Cost + Escalation	0	0	0	0	0	1,579	1,579	1,584	0	(6)	1,579	1,579	0
Indirect Cost	0	0	0	0	0	81	81	79	0	2	81	81	0
WBS[3]Totals:	0	0	0	0	0	1,660	1,660	1,663	0	(3)	1,660	1,660	0
2.3.3 Data Routing & Trigger Farm													

NuMI Other Project Costs

($000's Omitted)

Cost Performance Report - Work Breakdown Structure														
Contractor: Fermi National Accelerator Laboratory				Contract Type/No:			Project Name/No:		Report Period:					
Location: Batavia							NuMI Other Proj Costs		2/28/03	3/31/03				
Quantity	Negotiated Cost		Est. Cost Authorized Unpriced Work	Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling				
1	62,200		0	0	0	62,200	0		0	0				
WBS[2]	Current Period					Cumulative to Date					At Completion			
WBS[3]	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance					
Results...	Work	Work	Work			Work	Work	Work				Latest		
Item	Scheduled	Performed	Performed	Schedule	Cost	Scheduled	Performed	Performed	Schedule	Cost	Budgeted	Revised Estimate	Variance	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	
Direct Cost + Escalation	5	0	0	(5)	0	1,194	1,199	1,199	5	0	1,241	1,241	0	
WBS[3]Totals:	5	0	0	(5)	0	1,194	1,199	1,199	5	0	1,241	1,241	0	
2.3.4 Data Acquisition & Triggering														
Direct Cost + Escalation	0	0	0	(0)	0	388	389	389	1	0	391	391	0	
WBS[3]Totals:	0	0	0	(0)	0	388	389	389	1	0	391	391	0	
2.3.5 Database														
Direct Cost + Escalation	0	0	0	0	0	48	48	9	0	39	48	48	0	
Indirect Cost	0	0	0	0	0	1	1	0	0	1	1	1	0	
WBS[3]Totals:	0	0	0	0	0	48	48	9	0	40	48	48	0	
2.3.6 Auxilliary Systems														
Direct Cost + Escalation	11	10	5	(1)	5	435	434	469	(1)	(35)	460	460	0	
Indirect Cost	1	1	0	0	1	34	33	45	(0)	(11)	37	37	0	
WBS[3]Totals:	12	11	5	(1)	6	469	467	514	(2)	(47)	497	497	0	
2.3.7 Electronics Management														
Direct Cost + Escalation	5	(0)	0	(5)	(0)	124	101	145	(23)	(43)	143	143	0	
Indirect Cost	0	(0)	0	(0)	(0)	2	2	1	(0)	1	2	2	0	
WBS[3]Totals:	5	(0)	0	(5)	(0)	126	103	145	(23)	(43)	146	146	0	
2.3.8 Slow Control & Monitoring														
Direct Cost + Escalation	13	2	77	(11)	(74)	397	375	289	(22)	86	433	433	0	
Indirect Cost	0	0	(0)	(0)	0	11	11	12	(0)	(1)	12	12	0	
WBS[3]Totals:	14	2	77	(11)	(74)	409	386	301	(23)	85	445	445	0	
2.3.9 HV System														
Direct Cost + Escalation	2	0	0	(2)	0	63	74	66	11	7	74	74	0	
Indirect Cost	0	0	0	(0)	0	7	9	11	2	(2)	9	9	0	
WBS[3]Totals:	2	0	0	(2)	0	71	83	77	12	6	83	83	0	
WBS[2]Totals:	134	599	186	465	413	8,603	8,398	7,318	(205)	1,080	9,222	9,222	0	
2.4 Far Detector Installation														
2.4.1 FDI Completed Design Tasks														
Direct Cost + Escalation	0	0	0	0	0	0	0	0	0	0	0	0	0	
Indirect Cost	0	0	0	0	(0)	0	0	0	0	0	0	0	0	
WBS[3]Totals:	0	0	0	0	(0)	0	0	0	0	0	0	0	0	
2.4.2 FDI Management														
Direct Cost + Escalation	22	16	(3)	(5)	19	573	574	505	1	69	631	631	0	
Indirect Cost	1	0	0	(1)	(0)	28	27	28	(1)	(1)	30	30	0	
WBS[3]Totals:	22	16	(3)	(6)	19	601	602	533	0	68	661	661	0	
2.4.3 SDN-FDI Construction Oversight														
Direct Cost + Escalation	0	0	0	0	0	58	58	115	0	(57)	58	58	0	

NuMI Other Project Costs

($000's Omitted)

Cost Performance Report - Work Breakdown Structure

Contractor:	Fermi National Accelerator Laboratory				Contract Type/No:			Project Name/No:		Report Period:		
Location:	Batavia							NuMI Other Proj Costs		2/28/03	3/31/03	
Quantity	Negotiated Cost		Est. Cost Authorized Unpriced Work		Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling	
1	62,200		0		0	0	62,200	0		0	0	
WBS[2]	Current Period						Cumulative to Date				At Completion	
WBS[3] Results...	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance			Latest Revised Estimate	
Item	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Budgeted		Variance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
WBS[3]Totals:	0	0	0	0	0	58	58	115	0	(57)	58	58	0
2.4.4 FDI Soudan Lab Infrastructure Setup													
Direct Cost + Escalation	0	0	(2)	0	2	507	507	469	0	38	507	507	0
Indirect Cost	0	0	(0)	0	0	2	2	4	0	(2)	2	2	0
WBS[3]Totals:	0	0	(2)	0	2	509	509	473	0	36	509	509	0
2.4.5 SDN-FDI Detector Installation													
Direct Cost + Escalation	148	140	377	(8)	(237)	2,930	2,760	2,059	(170)	701	3,084	3,084	0
Indirect Cost	0	0	0	0	0	0	0	6	0	(6)	0	0	0
WBS[3]Totals:	148	140	377	(8)	(237)	2,930	2,760	2,065	(170)	695	3,084	3,084	0
2.4.6 SDN-FDI DNR Costs													
Direct Cost + Escalation	36	32	(0)	(4)	32	676	638	378	(38)	260	708	708	0
Indirect Cost	0	0	0	0	0	0	0	1	0	(1)	0	0	0
WBS[3]Totals:	36	32	(0)	(4)	32	676	638	378	(38)	260	708	708	0
2.4.7 FDI Alignment & Survey													
Direct Cost + Escalation	0	0	0	0	0	51	51	58	0	(7)	51	51	0
Indirect Cost	0	0	0	0	0	6	6	9	(0)	(3)	6	6	0
WBS[3]Totals:	0	0	0	0	0	57	57	67	(0)	(10)	57	57	0
WBS[2]Totals:	206	189	372	(17)	(183)	4,832	4,624	3,632	(208)	993	5,077	5,077	0
2.5 Near Detector Installation													
2.5.1 NDI Infrastructure													
Direct Cost + Escalation	44	36	1	(8)	35	136	106	53	(29)	53	384	384	0
Indirect Cost	13	10	0	(3)	10	35	28	14	(8)	13	104	104	0
WBS[3]Totals:	57	46	2	(11)	45	171	134	67	(37)	67	488	488	0
2.5.2 NDI Plane Assembly													
Direct Cost + Escalation	129	129	0	0	129	393	393	403	0	(10)	393	393	0
Indirect Cost	41	41	0	0	41	123	123	111	(0)	13	123	123	0
WBS[3]Totals:	171	171	0	0	170	516	516	513	0	3	516	516	0
2.5.3 NDI Detector Installation													
Direct Cost + Escalation	0	1	5	0	(5)	0	1	14	0	(13)	630	630	0
Indirect Cost	0	0	2	0	(1)	0	0	3	0	(3)	178	178	0
WBS[3]Totals:	1	1	7	0	(6)	1	1	17	0	(16)	808	808	0
2.5.4 NDI Facility Experimental Infrastructure													
Direct Cost + Escalation	0	0	0	0	0	0	0	0	0	0	133	133	0
Indirect Cost	0	0	0	0	0	0	0	0	0	0	26	26	0
WBS[3]Totals:	0	0	0	0	0	0	0	0	0	0	160	160	0
2.5.5 RBI SB&O Experimental Systems Outfitting													
Direct Cost + Escalation	184	125	133	(59)	(8)	518	409	418	(109)	(9)	2,523	2,523	0

NuMI Other Project Costs

($000's Omitted)

Cost Performance Report - Work Breakdown Structure

Contractor:	Fermi National Accelerator Laboratory				Contract Type/No:			Project Name/No:		Report Period:		
Location:	Batavia							NuMI Other Proj Costs		2/28/03	3/31/03	
Quantity	Negotiated Cost		Est. Cost Authorized Unpriced Work		Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling	
1	62,200		0		0	0	62,200	0		0	0	
WBS[2]	Current Period						Cumulative to Date				At Completion	
WBS[3]	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance			
Results...	Work	Work	Work			Work	Work	Work				Latest Revised	
Item	Scheduled	Performed	Performed	Schedule	Cost	Scheduled	Performed	Performed	Schedule	Cost	Budgeted	Estimate	Variance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Indirect Cost	0	0	(11)	0	11	0	0	0	0	0	0	0	0
WBS[3]Totals:	184	125	122	(59)	3	518	409	418	(109)	(9)	2,523	2,523	0
WBS[2]Totals:	413	343	131	(70)	212	1,205	1,060	1,015	(146)	45	4,495	4,495	0
2.6 MINOS Project Management													
2.6.1 FNL-Project Management													
Direct Cost + Escalation	17	17	20	0	(3)	1,004	1,004	1,077	0	(73)	1,103	1,103	0
Indirect Cost	5	5	6	0	(1)	313	313	294	0	19	345	345	0
WBS[3]Totals:	22	22	26	0	(4)	1,317	1,317	1,371	0	(54)	1,448	1,448	0
2.6.2 ANL-Project Management													
Direct Cost + Escalation	0	0	0	0	0	96	96	96	0	(0)	96	96	0
Indirect Cost	0	0	0	0	0	1	1	1	0	0	1	1	0
WBS[3]Totals:	0	0	0	0	0	98	98	98	0	(0)	98	98	0
WBS[2]Totals:	22	22	26	0	(4)	1,415	1,415	1,469	0	(54)	1,546	1,546	0
3.1 NuMI Conceptual Design													
3.1.1 FNL-BD-NuMI CDR													
Direct Cost + Escalation	0	0	0	0	0	407	407	407	0	0	407	407	0
Indirect Cost	0	0	0	0	0	82	82	80	0	2	82	82	0
WBS[3]Totals:	0	0	0	0	0	489	489	487	0	2	489	489	0
3.1.2 FNL-BD-NuMI FESS CDR													
Direct Cost + Escalation	0	0	0	0	0	282	282	282	0	0	282	282	0
Indirect Cost	0	0	0	0	0	64	64	64	0	0	64	64	0
WBS[3]Totals:	0	0	0	0	0	346	346	346	0	0	346	346	0
3.1.3 FNL-NuMI Beam Design													
Direct Cost + Escalation	0	0	0	0	0	612	612	612	0	(0)	612	612	0
Indirect Cost	0	0	0	0	0	186	186	184	0	3	186	186	0
WBS[3]Totals:	0	0	0	0	0	798	798	796	0	3	798	798	0
3.1.4 FNL-BD-NuMI Project Management													
Direct Cost + Escalation	0	0	0	0	0	184	184	184	0	(0)	184	184	0
Indirect Cost	0	0	0	0	0	51	51	50	0	1	51	51	0
WBS[3]Totals:	0	0	0	0	0	235	235	234	0	1	235	235	0
3.1.5 FNL-Soudan Lab Design													
Direct Cost + Escalation	0	0	0	0	0	55	55	56	0	(1)	55	55	0
Indirect Cost	0	0	0	0	0	9	9	9	0	0	9	9	0
WBS[3]Totals:	0	0	0	0	0	64	64	65	0	(1)	64	64	0
WBS[2]Totals:	0	0	0	0	0	1,933	1,933	1,928	0	5	1,933	1,933	0
3.2 MINOS Detector R&D													

NuMI Other Project Costs

($000's Omitted)

Cost Performance Report - Work Breakdown Structure													
Contractor: Fermi National Accelerator Laboratory				Contract Type/No:			Project Name/No:		Report Period:				
Location: Batavia							NuMI Other Proj Costs		2/28/03	3/31/03			
Quantity	Negotiated Cost		Est. Cost Authorized Unpriced Work	Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling			
1	62,200		0	0	0	62,200	0		0	0			
WBS[2]	Current Period					Cumulative to Date					At Completion		
WBS[3] Results...	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance			Latest	
Item	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Budgeted	Revised Estimate	Variance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
3.2.1 FNL-MINOS Scintillator R&D													
Direct Cost + Escalation	0	0	0	0	0	879	879	870	0	9	879	879	0
Indirect Cost	0	0	0	0	0	116	116	118	0	(1)	116	116	0
WBS[3]Totals:	0	0	0	0	0	995	995	988	0	8	995	995	0
3.2.2 FNL-MINOS Steel R&D													
Direct Cost + Escalation	0	0	0	0	0	553	553	550	0	2	553	553	0
Indirect Cost	0	0	0	0	0	96	96	94	0	2	96	96	0
WBS[3]Totals:	0	0	0	0	0	649	649	644	0	4	649	649	0
3.2.3 FNL-RD-Neutrino Oscillation R&D													
Direct Cost + Escalation	0	0	0	0	0	116	116	116	0	0	116	116	0
Indirect Cost	0	0	0	0	0	20	20	20	(0)	0	20	20	0
WBS[3]Totals:	0	0	0	0	0	136	136	136	(0)	0	136	136	0
WBS[2]Totals:	0	0	0	0	0	1,780	1,780	1,768	(0)	12	1,780	1,780	0
3.3 MINOS Cavern													
3.3.0 Preconstruction Work													
Direct Cost + Escalation	0	0	0	0	0	758	758	758	0	0	758	758	0
WBS[3]Totals:	0	0	0	0	0	758	758	758	0	0	758	758	0
3.3.1 Cavern Construction													
Direct Cost + Escalation	0	0	154	0	(154)	6,597	6,597	6,597	0	0	6,597	6,597	0
WBS[3]Totals:	0	0	154	0	(154)	6,597	6,597	6,597	0	0	6,597	6,597	0
3.3.2 Cavern Outfitting													
Direct Cost + Escalation	0	0	227	0	(227)	7,171	7,171	7,171	0	0	7,171	7,171	0
WBS[3]Totals:	0	0	227	0	(227)	7,171	7,171	7,171	0	0	7,171	7,171	0
WBS[2]Totals:	0	0	381	0	(381)	14,527	14,527	14,527	0	0	14,527	14,527	0
3.4 Soudan/MINOS Operating													
3.4.1 UMN-Mine Crew Support/Soudan Gen'l Oper													
Direct Cost + Escalation	19	21	(66)	1	86	1,581	1,581	1,279	0	302	1,702	1,702	0
Indirect Cost	0	0	0	0	0	8	8	27	0	(20)	8	8	0
WBS[3]Totals:	19	21	(66)	1	86	1,588	1,588	1,306	0	282	1,709	1,709	0
3.4.2 UMN-Breitung Township Building Rental													
Direct Cost + Escalation	3	4	(0)	0	4	104	105	75	0	29	114	114	0
WBS[3]Totals:	3	4	(0)	0	4	104	105	75	0	29	114	114	0
3.4.3 UMN-E Peterson Salary													
Direct Cost + Escalation	0	0	(1)	0	1	73	73	71	0	2	73	73	0
WBS[3]Totals:	0	0	(1)	0	1	73	73	71	0	2	73	73	0
WBS[2]Totals:	23	24	(66)	1	91	1,765	1,766	1,452	1	313	1,896	1,896	0

NuMI Other Project Costs

($000's Omitted)

Cost Performance Report - Work Breakdown Structure													
Contractor: Fermi National Accelerator Laboratory				Contract Type/No:			Project Name/No:		Report Period:				
Location: Batavia							NuMI Other Proj Costs		2/28/03	3/31/03			
Quantity	Negotiated Cost		Est. Cost Authorized Unpriced Work	Tgt. Profit/ Fee %		Tgt. Price	Est Price	Share Ratio	Contract Ceiling	Estimated Contract Ceiling			
1	62,200		0	0	0	62,200	0		0	0			
WBS[2]	Current Period					Cumulative to Date					At Completion		
WBS[3] Results...	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance			Latest	
Item	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Work Scheduled	Work Performed	Work Performed	Schedule	Cost	Budgeted	Revised Estimate	Variance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
General and Administrative	0	0	0	0	0	0	0	0	0	0	0	0	0
Undistributed Budget											0	0	0
Sub Total	1,003	1,319	1,197	316	122	62,633	62,416	59,747	(217)	2,669	67,602	67,602	0
Contingency + MINOS Scope Reserve											3,628	3,628	0
Total NuMI Other Proj Costs	1,003	1,319	1,197	316	122	62,633	62,416	59,747	(217)	2,669	71,230	71,230	0
UK In-Kind Contribution	(19)	(30)	(30)	(12)	0	(4,767)	(4,734)	(4,734)	33	0	(5,272)	(5,272)	0
Minnesota Preconstruction Funds	0	0	0	0	0	(758)	(758)	(758)	0	0	(758)	(758)	0
Minnesota Construction Funds FY99	0	0	0	0	0	(3,000)	(3,000)	(3,000)	0	0	(3,000)	(3,000)	0
Total US Funds	985	1,289	1,167	305	122	54,108	53,924	51,254	(184)	2,669	62,200	62,200	0
WBS[2]Totals:													
Direct Cost + Escalation	904	1,171	875	267	297	40,263	40,052	37,837	(211)	2,215	44,711	44,711	0
Indirect Cost	77	124	8	47	116	2,365	2,358	2,235	(6)	124	2,755	2,755	0
Subtotal	980	1,295	883	315	412	42,628	42,411	40,072	(217)	2,339	47,466	47,466	0
UK In-Kind Contribution	(19)	(30)	(30)	(12)	0	(4,767)	(4,734)	(4,734)	33	0	(5,272)	(5,272)	0
Total MINOS Detector	962	1,265	853	303	412	37,861	37,677	35,337	(185)	2,339	42,195	42,195	0
Direct Cost + Escalation	23	24	315	1	(290)	19,371	19,372	19,029	1	343	19,502	19,502	0
Indirect Cost	0	0	0	0	0	633	633	646	0	(13)	633	633	0
Subtotal	23	24	315	1	(290)	20,004	20,005	19,675	1	330	20,135	20,135	0
Minnesota Preconstruction Funds	0	0	0	0	0	(758)	(758)	(758)	0	0	(758)	(758)	0
Minnesota Construction Funds FY99	0	0	0	0	0	(3,000)	(3,000)	(3,000)	0	0	(3,000)	(3,000)	0
Total Project Support	23	24	315	1	(290)	16,246	16,247	15,917	1	330	16,377	16,377	0
Contingency + MINOS Scope Reserve											3,628	3,628	0
Total US Funds	985	1,289	1,167	305	122	54,108	53,924	51,254	(184)	2,669	62,200	62,200	0

NuMI Other Project Costs

($000's Omitted)

Cost Performance Report - Baseline					
Contractor: Fermi National Accelerator Laboratory	Contract Type/No:	Project Name/No:	Report Period:		
Location: Batavia		NuMI Other Proj Costs	2/28/03	3/31/03	

(1) Original Contract Target Cost	(2) Negotiated Contract Changes	(3) Current Target Cost	(4) Est. Cost Authorized Authorized Unpriced Work	(5) Contract Budget Base (3) + (4)	(6) Total Allocated Budget	(7) Difference (5) - (6)
62,200	0	62,200	0	62,200	62,200	0

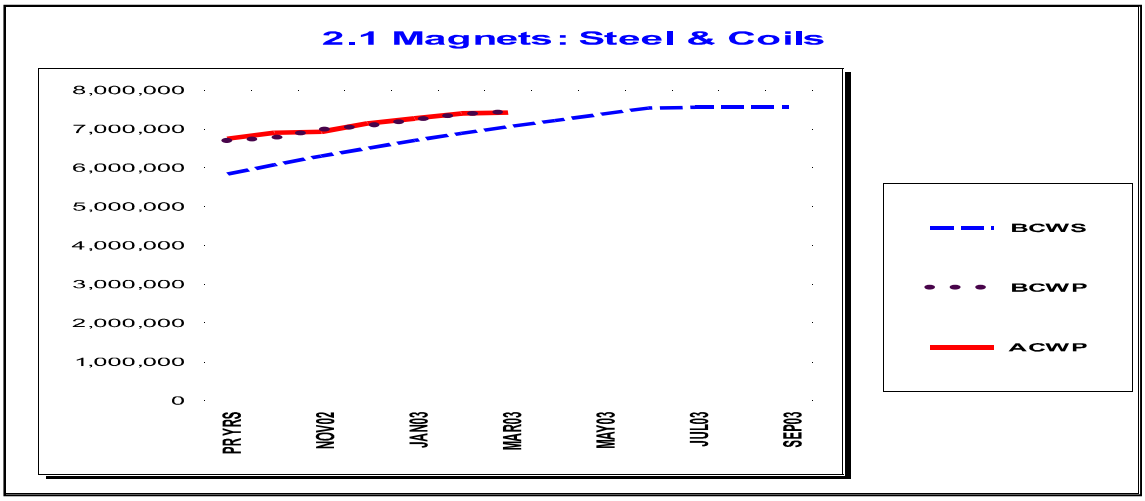
(8) Contract Start Date	(9) Contract Definitization Date	(10) Last Item Delivery Date	(11) Contract Completion Date	(12) Estimated Completion Date
10/1/97	4/30/04	4/30/04	4/30/04	4/30/04

Item	BCWS Cum to Date	BCWS for Report Period	Budgeted Cost for Work Scheduled (Non-Cumulative) Six Month Forecast +1 APR03	+2 MAY03	+3 JUN03	+4 JUL03	+5 AUG03	+6 SEP03	(Enter Specific Periods) FY04	FY05				Undist Budget	Total Budget
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
PM Baseline (Beginning of Period)	61,954	753	717	763	707	476	344	272	1,357	33	0	0	0	0	67,377
223 Reschedule WBS 2.3															25
226 Retire Negative Cost Variances															199
PM Baseline (End of Period)	62,633		767	808	730	494	361	290	1,481	37	0	0	0	0	67,602
Contingency															3,628
Total NuMI Other Project Costs															71,230
UK In-Kind Contribution															(5,272)
Minnesota Preconstruction Funds															(758)
Minnesota Preconstruction Funds FY99															(3,000)
Total US Funds															62,200

NuMI Other Project Costs

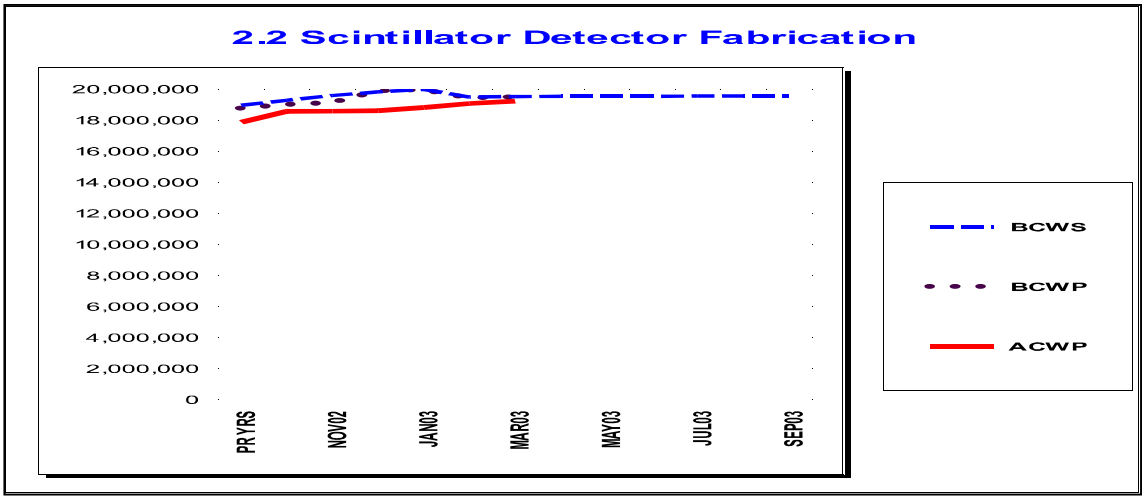
($000's Omitted)

2.1 Magnets: Steel & Coils



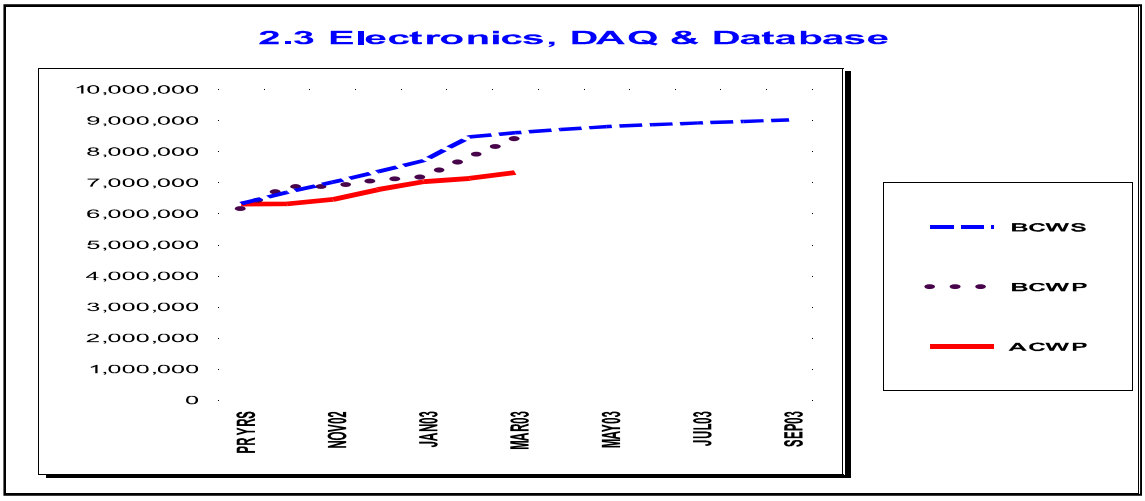
	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	5,831	6,069	6,296	6,498	6,698	6,881	7,051	7,210	7,373	7,532	7,550	7,551	7,552
BCWP	6,687	6,754	6,969	7,066	7,219	7,363	7,433						
ACWP	6,743	6,894	6,921	7,137	7,263	7,393	7,413						

2.2 Scintillator Detector Fabrication



	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	18,953	19,283	19,589	19,818	19,981	19,487	19,522	19,531	19,537	19,542	19,548	19,553	19,556
BCWP	18,752	18,992	19,098	19,863	19,941	19,408	19,481						
ACWP	17,860	18,569	18,576	18,613	18,815	19,077	19,224						

2.3 Electronics, DAQ & Database

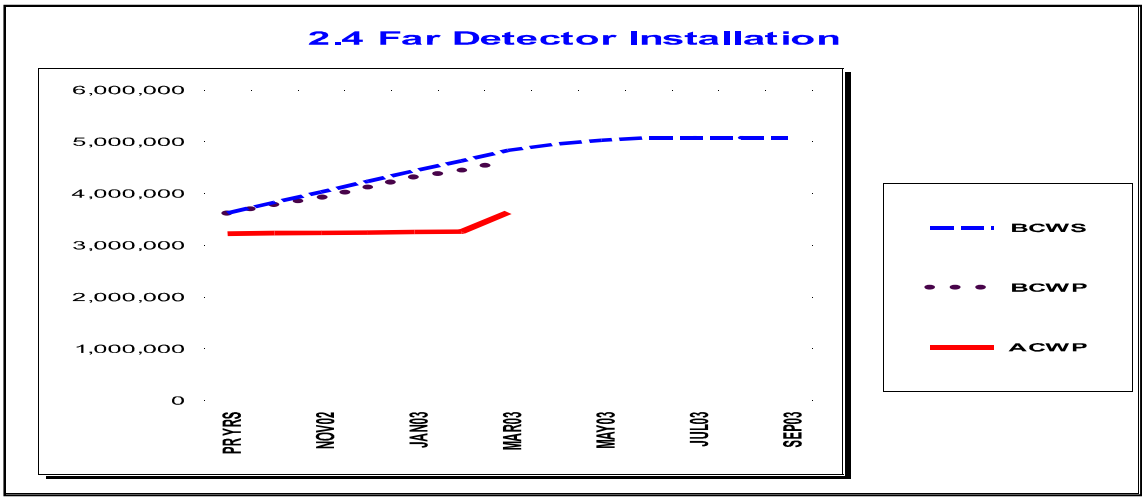


	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	6,323	6,682	7,010	7,352	7,708	8,469	8,603	8,704	8,798	8,861	8,917	8,968	9,017
BCWP	6,147	6,857	6,857	7,067	7,167	7,799	8,398						
ACWP	6,307	6,314	6,452	6,774	7,028	7,132	7,318						

NuMI Other Project Costs

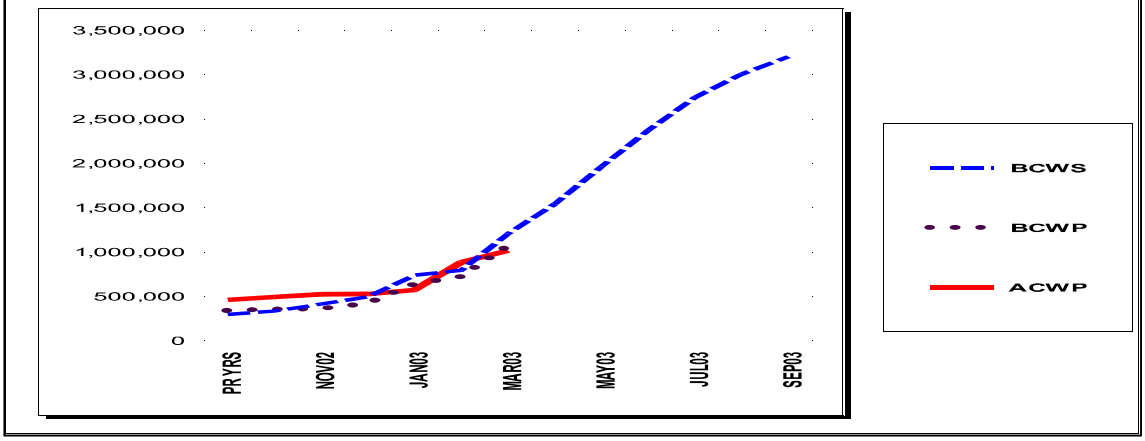
($000's Omitted)

2.4 Far Detector Installation



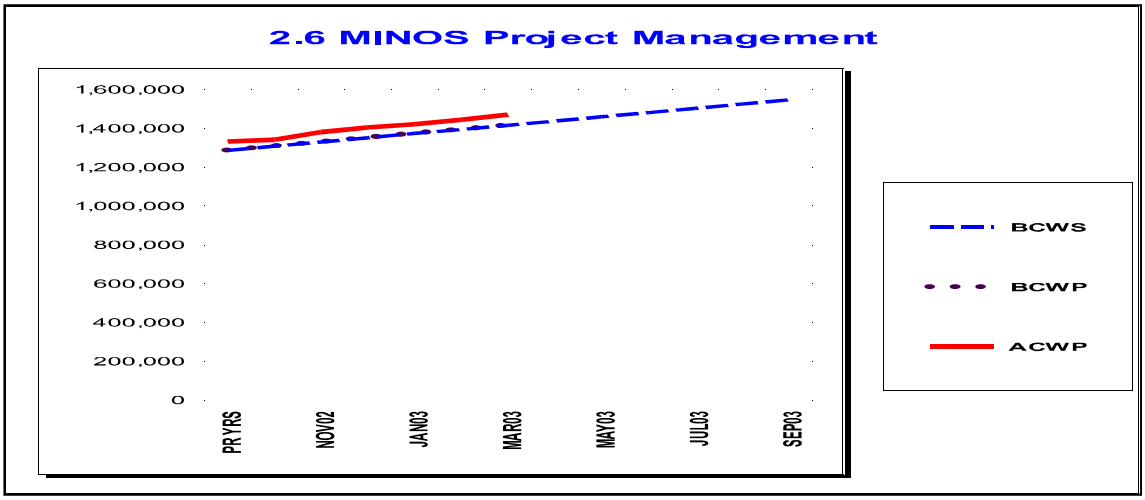
	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	3,621	3,827	4,027	4,233	4,439	4,626	4,832	4,949	5,026	5,077	5,077	5,077	5,077
BCWP	3,612	3,779	3,912	4,112	4,312	4,436	4,624						
ACWP	3,221	3,233	3,238	3,242	3,254	3,260	3,632						

2.5 Near Detector Installation



	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	295	334	413	495	738	793	1,205	1,541	1,963	2,371	2,742	3,005	3,200
BCWP	336	351	358	415	634	717	1,060						
ACWP	460	492	524	526	572	885	1,015						

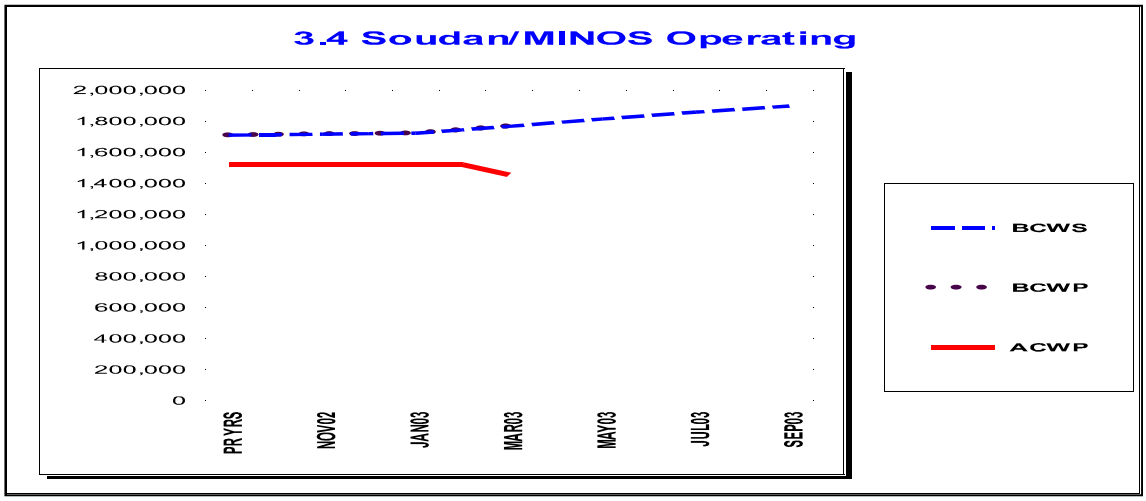
2.6 MINOS Project Management



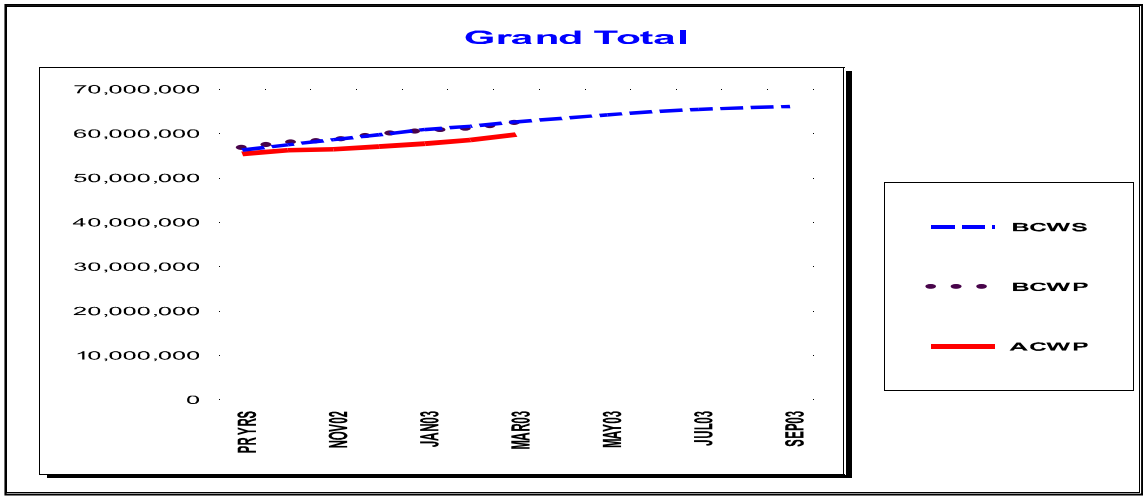
	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	1,285	1,307	1,329	1,351	1,373	1,393	1,415	1,436	1,459	1,480	1,502	1,524	1,546
BCWP	1,285	1,307	1,329	1,351	1,373	1,393	1,415						
ACWP	1,331	1,341	1,380	1,403	1,420	1,443	1,469						

NuMI Other Project Costs

($000's Omitted)



	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	1,708	1,711	1,714	1,718	1,721	1,743	1,765	1,789	1,813	1,835	1,856	1,876	1,896
BCWP	1,708	1,711	1,715	1,717	1,721	1,742	1,766						
ACWP	1,519	1,519	1,519	1,519	1,519	1,519	1,452						



	PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03
BCWS	56,256	57,454	58,617	59,704	60,897	61,630	62,633	63,399	64,207	64,937	65,431	65,792	66,083
BCWP	56,767	57,990	58,476	59,829	60,606	61,096	62,416						
ACWP	55,386	56,211	56,454	57,059	57,712	58,549	59,747						

NuMI Other Project Costs - US Funds

($000's Omitted)

Program:	Description:	Approval:
NUMIOPC	NuMI Other Proj Costs	Program Manager
Run Date: 04/23/03	Status Date: 3/31/2003	Functional Manager
		Cost Account Manager

DESCRIPTION		PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03	FY04	FY05	TOTAL
2.1 Magnets: Steel & Coils																	
2.1.1 Steel Plane Fabrication	BCWS	3,100	200	189	164	164	148	164	158	164	158	18	1	1	14	0	4,642
	ACWP	3,740	145	22	220	120	130	20	0	0	0	0	0	0	0	0	4,398
2.1.2 Steel handling fixtures	BCWS	773	0	0	0	0	0	0	0	0	0	0	0	0	0	0	773
	ACWP	793	0	0	0	0	0	0	0	0	0	0	0	0	0	0	793
2.1.3 Near Detector Support Structures	BCWS	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	5
	ACWP	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2.1.4 Magnet Coil	BCWS	1,388	37	36	37	35	35	6	0	0	0	0	0	0	0	0	1,575
	ACWP	1,657	6	6	-4	3	0	0	0	0	0	0	0	0	0	0	1,669
2.1.5 Detector Plane Prototypes	BCWS	501	0	0	0	0	0	0	0	0	0	0	0	0	0	0	501
	ACWP	496	0	0	0	0	0	0	0	0	0	0	0	0	0	0	496
2.1.6 Steel Management	BCWS	68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	71
	ACWP	55	0	0	0	1	0	0	0	0	0	0	0	0	0	0	56
WBS[2] Totals:	BCWS	5,831	238	227	202	200	183	170	159	164	159	18	1	1	14	0	7,566
	ACWP	6,743	151	27	216	125	130	21	0	0	0	0	0	0	0	0	7,413
2.2 Scintillator Detector Fabrication																	
2.2.1 Scintillator Strips	BCWS	2,987	62	57	6	0	-115	0	0	0	0	0	0	0	0	0	2,998
	ACWP	2,888	4	43	8	24	3	1	0	0	0	0	0	0	0	0	2,972
2.2.2 Fiber	BCWS	4,140	9	6	6	6	-129	0	0	0	0	0	0	0	0	0	4,039
	ACWP	3,300	418	-64	5	36	79	94	0	0	0	0	0	0	0	0	3,868
2.2.3 Scintillator Modules	BCWS	1,963	1	1	1	1	42	0	0	0	0	0	0	0	0	0	2,008
	ACWP	1,951	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1,953
2.2.4 Photodetector Systems	BCWS	1,694	45	48	24	4	-95	0	0	0	0	0	0	0	0	0	1,720
	ACWP	1,570	56	0	17	13	11	0	0	0	0	0	0	0	0	0	1,668
2.2.5 Mux Boxes & Connectors	BCWS	1,014	23	19	14	6	-21	1	1	1	1	1	1	0	0	0	1,063
	ACWP	1,043	15	0	15	7	7	0	0	0	0	0	0	0	0	0	1,088
2.2.6 Calibration Systems	BCWS	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.2.7 Ass'y & Test Equipment	BCWS	1,729	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,729
	ACWP	1,721	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,721
2.2.8 Factories	BCWS	2,929	120	116	120	95	-219	24	3	0	0	0	0	0	0	0	3,188
	ACWP	2,815	149	10	-15	89	135	26	0	0	0	0	0	0	0	0	3,209
2.2.9 Scintillator Management	BCWS	347	2	2	2	2	2	0	0	0	0	0	0	0	0	0	355
	ACWP	351	0	2	2	5	0	0	0	0	0	0	0	0	0	0	359
WBS[2] Totals:	BCWS	16,806	262	248	173	113	-535	26	5	1	1	1	1	0	0	0	17,104
	ACWP	15,639	643	-8	32	175	236	121	0	0	0	0	0	0	0	0	16,838
2.3 Electronics, DAQ & Database																	
2.3.1 Near Detector Front End	BCWS	2,460	314	287	300	314	468	95	64	63	44	48	44	42	161	5	4,712
	ACWP	2,291	-31	88	308	198	62	104	0	0	0	0	0	0	0	0	3,021
2.3.2 Far Detector Front-end	BCWS	929	0	0	0	0	255	0	0	0	0	0	0	0	0	0	1,184
	ACWP	1,184	0	0	0	0	4	0	0	0	0	0	0	0	0	0	1,188
2.3.5 Database	BCWS	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48
	ACWP	8	0	0	0	0	1	0	0	0	0	0	0	0	0	0	9
2.3.6 Auxilliary Systems	BCWS	133	10	9	9	10	8	9	9	2	1	0	0	0	5	0	206
	ACWP	170	3	50	-12	11	7	2	0	0	0	0	0	0	0	0	230

NuMI Other Project Costs - US Funds

($000's Omitted)

Program:	Description:	Approval:
NUMIOPC	NuMI Other Proj Costs	Program Manager
Run Date: 04/23/03	Status Date: 3/31/2003	Functional Manager
		Cost Account Manager

DESCRIPTION		PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03	FY04	FY05	TOTAL
2.3.7 Electronics Management	BCWS	93	6	5	5	6	5	5	5	5	4	2	2	1	0	0	146
	ACWP	102	0	0	0	44	0	0	0	0	0	0	0	0	0	0	145
2.3.8 Slow Control & Monitoring	BCWS	324	15	14	14	15	13	14	14	14	7	0	0	0	0	0	445
	ACWP	195	0	0	0	0	28	77	0	0	0	0	0	0	0	0	301
2.3.9 HV System	BCWS	57	3	3	2	2	2	2	2	2	2	2	2	2	1	0	83
	ACWP	71	5	0	1	0	0	0	0	0	0	0	0	0	0	0	77
WBS[2] Totals:	BCWS	4,045	347	317	331	346	751	125	95	88	59	53	48	46	167	5	6,824
	ACWP	4,021	-22	139	296	252	102	183	0	0	0	0	0	0	0	0	4,970
2.4 Far Detector Installation																	
2.4.1 FDI Completed Design Tasks	BCWS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.4.2 FDI Management	BCWS	470	22	22	22	22	21	22	22	22	15	0	0	0	0	0	661
	ACWP	498	12	5	4	12	5	-3	0	0	0	0	0	0	0	0	533
2.4.3 SDN-FDI Construction Oversight	BCWS	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58
	ACWP	115	0	0	0	0	0	0	0	0	0	0	0	0	0	0	115
2.4.4 FDI Soudan Lab Infrastructure Setup	BCWS	509	0	0	0	0	0	0	0	0	0	0	0	0	0	0	509
	ACWP	475	0	0	0	1	0	-2	0	0	0	0	0	0	0	0	473
2.4.5 SDN-FDI Detector Installation	BCWS	2,062	148	143	148	148	134	148	78	46	30	0	0	0	0	0	3,084
	ACWP	1,688	0	0	0	0	0	377	0	0	0	0	0	0	0	0	2,065
2.4.6 SDN-FDI DNR Costs	BCWS	465	36	35	36	36	32	36	18	9	6	0	0	0	0	0	708
	ACWP	378	0	0	0	0	0	0	0	0	0	0	0	0	0	0	378
2.4.7 FDI Alignment & Survey	BCWS	57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57
	ACWP	67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67
WBS[2] Totals:	BCWS	3,621	206	200	206	206	187	206	117	77	51	0	0	0	0	0	5,077
	ACWP	3,221	12	5	4	13	5	372	0	0	0	0	0	0	0	0	3,632
2.5 Near Detector Installation																	
2.5.1 NDI Infrastructure	BCWS	55	12	11	12	12	11	57	34	18	11	19	7	2	226	0	488
	ACWP	43	0	9	1	2	11	2	0	0	0	0	0	0	0	0	67
2.5.2 NDI Plane Assembly	BCWS	240	27	67	11	0	0	171	0	0	0	0	0	0	0	0	516
	ACWP	413	32	22	2	41	2	0	0	0	0	0	0	0	0	0	513
2.5.3 NDI Detector Installation	BCWS	0	0	0	0	0	0	1	1	1	1	1	0	0	773	32	808
	ACWP	4	0	1	0	3	3	7	0	0	0	0	0	0	0	0	17
2.5.4 NDI Facility Experimental Infrastructure	BCWS	0	0	0	0	0	0	0	1	0	55	10	6	6	82	0	160
	ACWP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.5.5 RBI SB&O Experimental Systems Outfitting	BCWS	0	0	0	60	230	44	184	300	404	341	341	251	187	182	0	2,523
	ACWP	0	0	0	0	0	296	122	0	0	0	0	0	0	0	0	418
WBS[2] Totals:	BCWS	295	39	79	82	242	55	413	335	422	408	371	263	195	1,263	32	4,495
	ACWP	460	32	32	3	46	312	131	0	0	0	0	0	0	0	0	1,015
2.6 MINOS Project Management																	
2.6.1 FNL-Project Management	BCWS	1,187	22	21	22	22	20	22	21	22	21	22	22	21	0	0	1,448
	ACWP	1,234	9	39	23	17	24	26	0	0	0	0	0	0	0	0	1,371
2.6.2 ANL-Project Management	BCWS	98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98
	ACWP	98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98
WBS[2] Totals:	BCWS	1,285	22	21	22	22	20	22	21	22	21	22	22	21	0	0	1,546
	ACWP	1,331	9	39	23	17	24	26	0	0	0	0	0	0	0	0	1,469
3.1 NuMI Conceptual Design																	

NuMI Other Project Costs - US Funds

($000's Omitted)

Program:	Description:	Approval:
NUMIOPC	NuMI Other Proj Costs	Program Manager
Run Date: 04/23/03	Status Date: 3/31/2003	Functional Manager
		Cost Account Manager

DESCRIPTION		PR YRS	OCT02	NOV02	DEC02	JAN03	FEB03	MAR03	APR03	MAY03	JUN03	JUL03	AUG03	SEP03	FY04	FY05	TOTAL
3.1.1 FNL-BD-NuMI CDR	BCWS	489	0	0	0	0	0	0	0	0	0	0	0	0	0	0	489
	ACWP	487	0	0	0	0	0	0	0	0	0	0	0	0	0	0	487
3.1.2 FNL-BD-NuMI FESS CDR	BCWS	346	0	0	0	0	0	0	0	0	0	0	0	0	0	0	346
	ACWP	346	0	0	0	0	0	0	0	0	0	0	0	0	0	0	346
3.1.3 FNL-NuMI Beam Design	BCWS	798	0	0	0	0	0	0	0	0	0	0	0	0	0	0	798
	ACWP	796	0	0	0	0	0	0	0	0	0	0	0	0	0	0	796
3.1.4 FNL-BD-NuMI Project Management	BCWS	235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	235
	ACWP	234	0	0	0	0	0	0	0	0	0	0	0	0	0	0	234
3.1.5 FNL-Soudan Lab Design	BCWS	64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64
	ACWP	65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65
WBS[2] Totals:	BCWS	1,933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,933
	ACWP	1,928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,928
3.2 MINOS Detector R&D																	
3.2.1 FNL-MINOS Scintillator R&D	BCWS	995	0	0	0	0	0	0	0	0	0	0	0	0	0	0	995
	ACWP	988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	988
3.2.2 FNL-MINOS Steel R&D	BCWS	649	0	0	0	0	0	0	0	0	0	0	0	0	0	0	649
	ACWP	644	0	0	0	0	0	0	0	0	0	0	0	0	0	0	644
3.2.3 FNL-RD-Neutrino Oscillation R&D	BCWS	136	0	0	0	0	0	0	0	0	0	0	0	0	0	0	136
	ACWP	136	0	0	0	0	0	0	0	0	0	0	0	0	0	0	136
WBS[2] Totals:	BCWS	1,780	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,780
	ACWP	1,768	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,768
3.3 MINOS Cavern																	
3.3.0 Preconstruction Work	BCWS	758	0	0	0	0	0	0	0	0	0	0	0	0	0	0	758
	ACWP	758	0	0	0	0	0	0	0	0	0	0	0	0	0	0	758
3.3.1 Cavern Construction	BCWS	6,597	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,597
	ACWP	6,442	1	0	0	0	0	154	0	0	0	0	0	0	0	0	6,597
3.3.2 Cavern Outfitting	BCWS	7,171	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7,171
	ACWP	7,049	-96	-5	0	-3	0	227	0	0	0	0	0	0	0	0	7,171
WBS[2] Totals:	BCWS	14,527	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14,527
	ACWP	14,249	-95	-5	0	-3	0	381	0	0	0	0	0	0	0	0	14,527
3.4 Soudan/MINOS Operating																	
3.4.1 UMN-Mine Crew Support/Soudan Gen'l Operations	BCWS	1,550	0	0	0	0	18	19	20	20	19	21	19	20	0	0	1,709
	ACWP	1,372	0	0	0	0	0	-66	0	0	0	0	0	0	0	0	1,306
3.4.2 UMN-Breitung Township Building Rental	BCWS	85	3	3	3	3	3	3	3	3	3	0	0	0	0	0	114
	ACWP	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75
3.4.3 UMN-E Peterson Salary	BCWS	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73
	ACWP	72	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	71
WBS[2] Totals:	BCWS	1,708	3	3	3	3	22	23	24	24	23	21	19	20	0	0	1,896
	ACWP	1,519	0	0	0	0	0	-66	0	0	0	0	0	0	0	0	1,452
Grand Totals:	BCWS	51,831	1,118	1,095	1,021	1,133	683	985	756	798	721	486	354	284	1,443	37	62,746
	ACWP	50,878	731	228	575	624	809	1,167	0	0	0	0	0	0	0	0	55,012

NuMI Project Obligations

$000's Omitted

WBS #	DESCRIPTION	Amounts as of March 31, 2003					
		Total Budget	PTD Cost	PO Encumbrances	Requisition Encumbrances	PTD Obligations	Remaining Obligation Authority
1.1.1	Extraction & Primary Beam	2,817.5	2,624.4	103.8	4.8	2,732.9	84.6
1.1.2	Neutrino Beam Devices	7,395.5	6,295.1	294.9	0.0	6,590.0	805.5
1.1.3	Power Supply System	3,533.2	3,567.5	21.5	0.0	3,589.0	(55.8)
1.1.4	Hadron Decay & Absorber	541.5	584.2	40.6	0.0	624.8	(83.2)
1.1.5	Neutrino Beam Monitoring	513.8	146.4	315.7	0.0	462.1	51.6
1.1.6	Alignment Systems	181.9	182.7	0.6	0.0	183.3	(1.5)
1.1.7	Water, Vacuum & Gas Systems	1,113.5	857.4	49.0	80.3	986.8	126.8
1.1.8	Installation & Integration	755.0	765.3	49.1	10.5	824.9	(69.9)
1.1.9	Hadronic Hose	62.9	62.9	0.0	0.0	62.9	0.0
1.1	**Technical Components**	**16,914.9**	**15,085.9**	**875.3**	**95.6**	**16,056.8**	**858.1**
1.2.1	Facility Physics Design Phase	70.4	70.4	0.0	0.0	70.4	0.0
1.2.2	Facility Construction Title I Design Phase	1,436.8	1,436.8	0.0	0.0	1,436.8	0.0
1.2.3	Facility Construction Title II Design Phase	2,974.3	2,974.3	0.0	0.0	2,974.3	0.0
1.2.4	Facility Construction Phase	61,819.3	51,725.4	10,193.4	257.3	62,176.1	(356.8)
1.2	**Facility Construction**	**66,300.8**	**56,206.9**	**10,193.4**	**257.3**	**66,657.6**	**(356.8)**
1.3.1	FY98 Project Management	141.4	141.4	0.0	0.0	141.4	0.0
1.3.2	FY99 Project Management	661.4	661.4	0.0	0.0	661.4	0.0
1.3.3	FY00 Project Management	662.8	662.8	0.0	0.0	662.8	0.0
1.3.4	FY01 Project Management	422.6	422.6	0.0	0.0	422.6	0.0
1.3.5	FY02 Project Management	324.4	324.4	0.0	0.0	324.4	0.0
1.3.6	FY03 Project Management	120.6	189.5	0.0	0.0	189.5	(68.9)
1.3.9	Unallocated Budget	1,400.0	0.0	0.0	0.0	0.0	1,400.0
1.3	**Project Management**	**3,733.3**	**2,402.2**	**0.0**	**0.0**	**2,402.2**	**1,331.1**
1	**NuMI TEC (Total Estimated Cost)**	**86,949.0**	**73,695.0**	**11,068.7**	**352.9**	**85,116.6**	**1,832.4**
2.1.1	MINOS-Steel Plane Fabrication	4,536.2	4,397.7	138.5	0.0	4,536.2	0.0
2.1.2	MINOS-Steel Handling Fixtures	793.3	793.3	0.0	0.0	793.3	0.0
2.1.3	MINOS Near Detector Support Structures	1.5	1.5	0.0	0.0	1.5	0.0
2.1.4	MINOS Magnet Coil	1,672.3	1,668.9	3.4	0.0	1,672.3	0.0
2.1.5	MINOS Detector Plane Prototypes	495.6	495.6	0.0	0.0	495.6	0.0
2.1.6	MINOS Steel Management	56.4	56.4	0.0	0.0	56.4	0.0
2.1	**MINOS-Magnets: Steel & Coils**	**7,555.2**	**7,413.3**	**141.9**	**0.0**	**7,555.2**	**0.0**
2.2.1	MINOS Scintillator Strips	2,990.0	2,971.5	18.5	0.0	2,990.0	0.0
2.2.2	MINOS Fiber	4,036.3	3,867.8	168.5	0.0	4,036.3	0.0
2.2.3	MINOS Scintillator Modules	2,008.4	1,953.0	55.4	0.0	2,008.4	0.0
2.2.4	MINOS Photodetector Systems	1,702.5	1,668.2	34.3	0.0	1,702.5	0.0
2.2.5	MINOS Mux Boxes & Connectors	1,093.7	1,087.9	5.8	0.0	1,093.7	0.0

NuMI Project Obligations

$000's Omitted

WBS #	DESCRIPTION	Amounts as of March 31, 2003					
		Total Budget	PTD Cost	PO Encumbrances	Requisition Encumbrances	PTD Obligations	Remaining Obligation Authority
2.2.6	MINOS Calibration Systems	0.0	0.0	0.0	0.0	0.0	0.0
2.2.7	MINOS Ass'y & Test Equipment	1,720.8	1,720.8	0.0	0.0	1,720.8	0.0
2.2.8	MINOS Factories	3,240.8	3,208.9	31.9	0.0	3,240.8	0.0
2.2.9	MINOS Scintillator Management	379.4	359.4	20.0	0.0	379.4	0.0
2.2	**MINOS-Scintillator Detector Fabrication**	**17,171.9**	**16,837.6**	**334.4**	**0.0**	**17,171.9**	**0.0**
2.3.1	MINOS Near Detector Front-end	3,921.3	3,021.1	612.7	287.5	3,921.3	0.0
2.3.2	MINOS Far Detector Front-end	1,187.6	1,187.6	0.0	0.0	1,187.6	0.0
2.3.3	MINOS Data Routing & Trigger Farm	0.0	0.0	0.0	0.0	0.0	0.0
2.3.4	MINOS Data Acquisition & Triggering	0.0	0.0	0.0	0.0	0.0	0.0
2.3.5	MINOS Database	10.0	8.6	1.4	0.0	10.0	0.0
2.3.6	MINOS Auxiliary Systems	230.4	230.1	0.3	0.0	230.4	0.0
2.3.7	MINOS Electronics Management	217.9	145.3	27.6	45.0	217.9	0.0
2.3.8	MINOS Slow Control & Monitoring	393.3	300.5	92.8	0.0	393.3	0.0
2.3.9	MINOS HV System	77.1	77.1	0.0	0.0	77.1	0.0
2.3	**MINOS-Electronics: DAQ & Database**	**6,037.6**	**4,970.4**	**734.8**	**332.4**	**6,037.6**	**0.0**
2.4.1	MINOS FDI Completed Design Tasks	0.0	0.0	0.0	0.0	0.0	0.0
2.4.2	MINOS FDI Minecrew Management	544.0	533.2	10.8	0.0	544.0	0.0
2.4.3	MINOS FDI MINOS Construction Oversight	114.8	114.8	0.0	0.0	114.8	0.0
2.4.4	MINOS FDI Soudan Lab Infrastructure Setup	474.8	473.0	1.9	0.0	474.8	0.0
2.4.5	MINOS FDI Detector Installation	2,064.9	2,064.9	0.0	0.0	2,064.9	0.0
2.4.6	MINOS FDI DNR Costs	378.4	378.3	0.1	0.0	378.4	0.0
2.4.7	MINOS FDI Alignment & Survey	68.7	67.5	1.2	0.0	68.7	0.0
2.4	**MINOS Far Detector Installation (FDI)**	**3,645.5**	**3,631.6**	**13.9**	**0.0**	**3,645.5**	**0.0**
2.5.1	MINOS NDI Infrastructure	69.5	67.0	0.0	2.5	69.5	0.0
2.5.2	MINOS NDI Plane Assembly	517.3	513.1	0.0	4.2	517.3	0.0
2.5.3	MINOS NDI Detector Installation	16.7	16.7	0.0	0.0	16.7	0.0
2.5.5	MINOS NDI SB&O Experimental Systems Outfitt	2,551.0	418.3	2,132.7	0.0	2,551.0	0.0
2.5	**MINOS Near Detector Installation (NDI)**	**3,154.6**	**1,015.2**	**2,132.7**	**6.7**	**3,154.6**	**0.0**
2.6.1	MINOS FNL Project Management	1,371.4	1,371.4	0.0	0.0	1,371.4	0.0
2.6.2	MINOS ANL Project Management	97.9	97.9	0.0	0.0	97.9	0.0
2.6	**MINOS Project Management**	**1,469.3**	**1,469.3**	**0.0**	**0.0**	**1,469.3**	**0.0**
2	**MINOS Detector**	**39,034.1**	**35,337.3**	**3,357.7**	**339.1**	**39,034.1**	**0.0**
3.1.1	NuMI CDR	487.2	487.2	0.0	0.0	487.2	0.0
3.1.2	NuMI FESS CDR	346.1	346.1	0.0	0.0	346.1	0.0
3.1.3	Beam Design	795.6	795.6	0.0	0.0	795.6	0.0
3.1.4	Project Management	234.0	234.0	0.0	0.0	234.0	0.0

NuMI Project Obligations

$000's Omitted

WBS #	DESCRIPTION	Amounts as of March 31, 2003					
		Total Budget	PTD Cost	PO Encumbrances	Requisition Encumbrances	PTD Obligations	Remaining Obligation Authority
3.1.5	Soudan Lab Design	64.9	64.9	0.0	0.0	64.9	0.0
3.1	**NuMI Conceptual Design**	**1,927.9**	**1,927.9**	**0.0**	**0.0**	**1,927.9**	**0.0**
3.2.1	MINOS Scintillator R&D	987.8	987.8	0.0	0.0	987.8	0.0
3.2.2	MINOS Steel R&D	644.5	644.5	0.0	0.0	644.5	0.0
3.2.3	Neutrino Oscillation R&D	135.8	135.8	0.0	0.0	135.8	0.0
3.2	**MINOS Detector R&D**	**1,768.1**	**1,768.1**	**0.0**	**0.0**	**1,768.1**	**0.0**
3.3	**MINOS Cavern**	**10,769.0**	**0.0**	**10,769.0**	**0.0**	**10,769.0**	**0.0**
3.4.1	Mine Crew Support/Soudan Gen'l Operations	1,530.7	1,306.0	224.7	0.0	1,530.7	0.0
3.4.2	Breitung Township Building Rental	75.5	75.4	0.1	0.0	75.5	0.0
3.4.3	E Peterson Salary	71.6	71.0	0.5	0.0	71.6	0.0
3.4	**Soudan/MINOS Operating**	**1,677.8**	**1,452.5**	**225.3**	**0.0**	**1,677.8**	**0.0**
3	**Project Support**	**16,142.7**	**5,148.4**	**10,994.3**	**0.0**	**16,142.7**	**0.0**
	Total Other Project Costs (OPC's)	**55,176.8**	**40,485.7**	**14,352.0**	**339.1**	**55,176.8**	**0.0**
	NuMI TPC (Total Project Cost)	**142,125.8**	**114,180.7**	**25,420.7**	**692.0**	**140,293.4**	**1,832.4**